An Address

ON THE

PERIPHERAL CIRCULATION AND ITS TREATMENT.

Delivered before the Annual Meeting of the British Balneological and Climatological Society, 1909,

BY

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The arterioles and capillaries and venules pervade every tissue and organ of the body, and specialists in this line can never be accused of poaching on another man's preserves. The importance of the capillaries has been aptly described by Leonard Hill, who says:

> The blood is brought into intimate relation with the tissues by diffusing through the endothelial wall of the capillaries, and this wall is of great tenuity; thereby takes place that change of material which maintains the combustion of the body and the fire of life.

It is the resistance in the arterioles and capillaries which maintains the mean or diastolic pressure in the aorta and large arteries, and any increase in this resistance has to be overcome by greater work on the part of the heart. The arterioles constitute the first line of defence, and, as I said in my Toronto address,[1] it is exceedingly fortunate that there is this first line of defence created by the action of the vasomotor nerves in the small arteries and arterioles, because if this were wanting, as at present constituted we would either have to go about on all fours or constantly run the risk of fatal syncope. Moreover, the blood would gravitate into the most dependent parts, the cooling surface would be enormous, the capillary velocity would be diminished, the blood would become surcharged with CO_2, and we would become cold-blooded animals. When the vasomotor nerves of a rabbit are paralysed it appears all right until you suspend it by the ears, and then it immediately dies. The arteriolar resistance saves us from such risks. When you get vasomotor paralysis the resistance is transferred to the capillaries, and you get a more gradual fall in the pressure gradient, the velocity of the blood in the capillaries is diminished, the pressure increased, and transudation readily takes place. In severe cases of Addison's disease in which the vasomotor nerves are deprived of their usual stimulus, the patient may not be able to assume the erect posture. The wonderful regulative mechanism of the vasomotor system enables the blood to be driven from the high-pressure main, the aorta and its principal branches, to the organs or systems that immediately require it. Witness the great supply to the extremities during exertion, and to the abdominal viscera during digestion. Increase of pressure within an artery improves its tone and raises its coefficient of elasticity. It is probably owing to these facts, as well as to the intervention of the vasomotor nerves, that the arteries of the lower extremities often contract when they are dependent and dilate when they are raised. This, of course, happens most readily when the arteries are healthy and the arterial blood pressure high. Under such conditions the common carotid can be felt contracted when the body is inverted. The arteries of the upper extremities obey the usual law and dilate under increased pressure. This increased tone under heightened pressure is probably a determining factor in the production of claudication of the arteries—a condition almost confined to the lower extremities, and one which is very difficult to remedy when once established. Perhaps other causal factors are excessive amount of lime salts, overaction of the suprarenal glands, and defective action of the thyroid.

The Arterioles.

It would be difficult or impossible to estimate the ever-varying capacity and sectional area of the arterioles and the velocity of the blood passing through them. What we do know is that on an average a similar quantity of blood passes through a section of the arterioles to that which passes through a section of the aorta in a unit of time. The resistance in the arterioles is directly as their length, and inversely as the square of their cross-sections or the fourth power of the diameter, and directly as the square of the velocity. The total sectional area of the arterioles is perhaps considerably less than that of the small arteries, and the velocity of the blood in them correspondingly greater. In cases of local syncope the arterioles shut down, and therefore the pressure and velocity in these particular vessels fall to zero. When the arterioles are contracted we know that the energy of the blood is to a large extent converted into velocity with a corresponding diminution in the lateral pressure. If you take a cold hand, there may be a difference of 50 mm. of mercury between the lateral pressure in the radial and that in a digital artery, but if the arterioles are dilated there is a much less abrupt fall in the pressure gradient. Moreover, in *post-mortem* examinations there is very seldom anything found wrong with the arterioles, except that they may be hypertrophied, but this is evidence of overaction rather than of lateral strain. The general arterial blood pressure can only be raised by the contraction of a large tract of arterioles, such as those of the splanchnic area, the skin, or muscles, and generally in health when one set is contracted another is dilated, so that a uniform mean arterial pressure is maintained. As a rule, the more contracted the arterioles the higher the arterial pressure in the arteries; and, again, this high potential in the arteries drives the blood with great velocity through the arterioles, and, of course, the greater the velocity the less the lateral pressure. A small area of arterioles, such as that of the hand, may be contracted without any effect on the general arterial pressure, and in this case the velocity of the blood in the contracted arterioles is not increased but diminished, owing to the increased friction and heightened viscosity of the blood. The blood may almost come to a standstill, and then the energy is largely that of pressure. When the arterioles of any local area are dilated, as at the commencement of an inflammation, or after the removal of an Esmarch's tourniquet, the whole of the capillaries are opened up and engorged with blood, and with this increased mass the pressure is raised, but the velocity is also heightened owing to the arterial potential remaining high and the resistance in the enlarged vessels being diminished. These little muscular vessels are well endowed with vasomotor nerves, and are subjected to postural variations in pressure. It is entirely due to their intervention that the capillaries are protected from the full hydrostatic effect of the blood when the body is in the erect posture. The potential increases in the arteries of the limbs when they are dependent, and if the arterioles are dilated from any cause the pressure in these little vessels and in the capillaries is much augmented, so that you may readily get petechial haemorrhages, but on the other hand, if the arterioles are much contracted, the potential in the arteries is largely converted into kinetic energy in the arterioles and capillaries.

The Capillaries.

The capillaries through which the interchange of nutritive pabulum and gases takes place between the blood and the tissues play a most important rôle in the animal economy; they constitute a vast filter bed for conveying nutritive material and oxygen to the tissues, and for removing waste products therefrom. These little vessels are of extreme tenuity and delicacy, consisting of a single layer of endothelium, yet they are capable of standing considerable internal pressure; they vary from about 0.5 to 1 millimetre in length, and from 7 to 13 micromillimetres in diameter. They are to a certain extent elastic, or at least they have the capacity of adapting themselves to the amount of blood which is driven through them, and they are supported by the surrounding tissues and intercelullar fluids. So numerous are these little vessels that it would be difficult to stick the point of a needle in any vascular area without wounding one or more, but in neurotic individuals you may wound many such vessels without drawing blood.

In cases of polycythaemia the capillaries of the body are fairly replete, but in ordinary mortals, especially in those of neurotic temperament, perhaps not a third are full at any one moment, and in a very cold extremity there may not be a twentieth of the number patent. Apply a sinapism to a very pallid skin, and you may wonder where

all the turgid capillaries have sprung from. By warm baths, friction, and general massage the arterioles are relaxed, the capillaries opened up, and hence there is a general fall in the arterial blood pressure. The energy in the capillaries is derived from that in the arteries and arterioles, and is a compound of lateral pressure and velocity. You will find all these problems discussed in my Toronto address, and I am here only concerned with the practical application of our science. The more dilated the arterioles and the more vascular the area, *caeteris paribus*, the greater the pressure and the less the velocity, and vice versa. The lateral pressure depends on the statical condition of the blood, and just in proportion as you introduce movement you convert the force of pressure into that of velocity. If you wish to drive a certain quantity of fluid through a set of tubes, the velocity will depend on the force of propulsion minus the obstruction to the outflow, with the inertia or viscosity of the blood (there is no fluid perfectly mobile) and the friction of the tubes; and the lateral pressure will increase as the outflow is obstructed—in short, as the statical condition is maintained.

The Capillary Pressure.

For estimating the pressure in the capillaries, perhaps the most convenient method is that of von Kries. I use three sizes of glass plates, measuring 20, 100, and 400 sq. mm., so a gram pressure on each of these plates represents respectively 50, 10, and 2.5 mm. of H_2O. The pressure stands in direct relation to the freedom of the inflow and the obstruction to the outflow. When the body is erect the dependent capillaries are largely protected from the brunt of the increased hydrostatic pressure by the intervention of the arterioles, but, notwithstanding this intervention, the pressure in the capillaries of an immobilized foot when the subject is standing, becomes very great, but, if you move the foot, the capillaries are compressed, the blood is driven onwards and the statical pressure is converted into velocity. The increased potential in the dependent arteries is thus partly converted into pressure and partly into velocity in the capillaries, and the velocity is further heightened by movement. The inversion of the body for a comparatively short time each day over a lengthened period should be sufficient to give rise to marked arterio-sclerosis of the cerebral vessels owing to increased statical pressure, because in the brain you could not introduce movement to hurry on the circulation. Moral, "Keep your head above water." All occupations which involve much standing or sitting must be injurious to the vessels of the lower extremities, hence such individuals should be encouraged to keep their lower limbs as restless as possible. Kentish fire relieves the monotony when you are listening to a wearisome speaker. Probably if an audience in church could indulge in this form of recreation their brains would be better supplied with blood, there would not be so many asleep, the hypnotic influence of the sermon would not be so effective, and possibly the Nonconformist conscience would not be so paralysed as it usually is to all extraneous influences for good.

All agents, such as dry heat, warm baths, and to a less extent massage and passive exercises which relax the arterioles, increase the freedom of flow into the capillaries and raise the lateral pressure in them and lower the arterial pressure. In proportion as the general arteriolar resistance is relaxed the resistance to the output from the heart is transferred from the arterioles to the second line of defence. This increases the bed of the arterial river and so lessens the resistance to the systolic output, but it does not necessarily lessen the total work of the heart, because the venous pressure is also raised and with it the diastolic tension in the ventricles, and consequently the systolic output. If the arteries be at all rigid, and not capable of adapting themselves to the altered conditions there may be a great waste in the cardiac energy. Hence the injudicious use of baths and vasomotor relaxants in the aged very readily gives rise to weariness, languor, faintness, and sickness. Those who think that warm baths are a panacea for all ills to which flesh is heir should be careful when administering them to those with sclerotic arteries to cloak their ignorance by keeping the patients afterwards for a long time in the recumbent posture until the arteries and arterioles have had time to regain their tone. After a warm bath, dry or moist, a cold or cool douche is usually a valuable adjuvant.

The Velocity of the Blood in the Capillaries.

In textbooks of physiology the capillary velocity is usually put down as 0.2 to 0.75 mm. per second, but in my opinion this is much too low an estimate of the average velocity, and I have said that anyone with a capillary velocity at the level of the heart which physiologists set down as normal might appropriately take up the refrain, "The hour of my departure's come." My method of calculating the capillary velocity is to take a glass rod 10 mm. in diameter and with the flat end compress the blood out of the capillaries, then with a stop-watch recording fifths of a second I time the period of the return of the blood. If you divide the radius of the rod (5 mm.) by the time, you get the apparent velocity per second. When fluid is circulating in a capillary tube the axial velocity is double the mean velocity. Now, the erythrocytes travel in the axis, but as they occupy at least four-fifths of the lumen of the vessel the mean must be about 0.8 of the apparent velocity. Under this method of calculation I have observed the capillary velocity to vary from about 0.4 mm. per second when the patient is dying to about 20 mm. per second in the great toe when the patient is standing and there is very high arterial potential. We know that in the large capillary bed the current is chiefly onwards to the veins, but in many of the capillaries the current is often reversed, and this lowers the mean onward velocity, but even if you half my estimates you are still a long way above the estimates of physiologists. In making your observations you must select some spot where there is a network of capillaries which you can completely empty, such as those in the back of the hand or finger, and you must also choose a spot where the return current flows from all parts of the circumference to the centre of your compressed area. You cannot estimate the velocity in the palmar surface of the finger end, because the small arterioles run up to the papillae at right angles to the surface, and when the blood is driven out it returns to all parts of the compressed area at the same time. For the sake of uniformity and comparison it is well to estimate the velocity in the hand, or other part, at the level of the heart, because the velocity is much increased by raising the potential in the arteries; you can often double the capillary velocity in the finger by lowering it 300 or 400 mm. below the heart level. The velocity of the blood in the capillaries stands to that in the arterioles inversely as the square of their cross sections, but as we do not know the sectional area of the arterioles there will be some difficulty in arriving at that of the capillaries. The velocity in these vessels depends on the arterial potential, minus the obstruction to the outflow with the friction against the tubes and the viscosity of the blood. I find the capillary velocity a valuable aid in forming an opinion as to the viscosity of the blood; if at the level of the heart—except, perhaps, in cases of polycythaemia—the velocity be high, you may conclude, without drawing a drop of blood, that the viscosity is not abnormal.

If there be a great difference between the systolic pressure in the aorta and the resistance, such as occurs in free aortic regurgitation or very advanced arterio-sclerotic changes, the arterial wave may be carried to the capillaries and give rise to pulsation in these vessels. This implies great waste of cardiac energy, and under such circumstances vasomotor relaxants must work mischief; yet many of your fraternity ignorantly prescribe their favourite baths without any knowledge of or regard for physical consequences. Vasomotor tonics and such agents as diminish the lime salts and improve the muscular tone constitute the best treatment.

Any obstruction to the outflow from the capillaries diminishes the velocity in them. Hence the congestive treatment of joints and other local lesions which is now known as the Bier treatment, but which was long ago carried out by the late Hugh Owen Thomas of Liverpool, while it lessens the velocity, it increases the statical pressure and transudation from the capillaries to the tissues. The extra-capillary pressure is about one-fourth of that within the vessels, and largely contributes to the onward movement of the lymph; this is also aided by muscular contractions, in the same way as assistance is thus given

to the capillary circulation. The Bier treatment retards the circulation of the lymph and blood and increases transudation, while massage has the opposite effects. Dr. Barry at the beginning of last century advocated the use of the suction pump to prevent the introduction to the system of the venom of snake-bite.

The Viscosity of the Blood.

The viscosity varies greatly, and is no doubt the great cause of the resistance in the capillaries. Normally it is about five times that of distilled water. This subject has been very ably investigated by Dr. John H. Watson and Dr. A. du Pre Denning, who have shown how an increase in the number of corpuscles greatly increases the viscosity. It is diminished by fever and increased by carbonic acid, and I have shown that when the capillary velocity falls to 1 mm. to the second or less the blood becomes surcharged with CO_2.

The viscosity is much increased by the salts of calcium, magnesium, manganese, and strontium, and hence these salts lessen transudation, and are thus useful in cases of orthostatic albuminuria, eczema, and urticaria. It is diminished by citric and phosphoric acids, the salts of potassium, ammonium, and sodium, thyroid and iodine. An increase in viscosity produces a most definite rise in the internal resistance, but we must remember that the living capillaries are more or less elastic, and offer much less resistance to the flow of blood than would be caused by rigid tubes of the same diameter. Moreover, it has been shown by Watson and Denning that "a given increase of pressure exerts a much greater accelerating effect on the rate of flow through tubes of fine calibre than through tubes of wide bore." This is corroborated by my observations on the great increase in the velocity in the capillaries produced by an increase in the arterial potential. By lessening the viscosity of the blood you lower the arterial resistance and diminish the work of the heart. In many cases the viscosity is too low, and this is, as a rule, easily remedied by the salts of calcium and magnesium.

The Interchange of Materials through the Capillary Walls.

There are some physiologists who would raise the endothelial cells of the capillary walls to the high level of secreting structures; not that they have any evidence, either from analogy or otherwise, in support of such a contention, but simply because they think that the physical properties of diffusion, osmosis, and filtration cannot account for the phenomena. They hold that the capillary pressure is low, and is more than counterbalanced by the endosmotic equivalent of the albumen and salts in the blood. When they recognize the enormous variations which take place in the pressure and velocity of the blood in the capillaries, they will have less difficulty in admitting the problem of filtration as applicable to the capillary wall. Moreover, the capillary walls do not form a semipermeable membrane, but are just as easily permeated, *caeteris paribus*, in one direction as in the other. In a network of capillaries the pressure must necessarily be higher in the efferent or distributing vessels connected with the arterioles than it is in the afferent or collecting tubules which unite to form the venules. You can thus have filtration and absorption going on side by side, just as in a hole in the wall divided by a midriff you can have strong currents of air flowing side by side in opposite directions. The fall in the pressure gradient in the capillaries must be fairly uniform from arteriole to venule; but, as there is usually a considerable fall from the capillaries to the venules, there must be a corresponding difference between the efferent and the afferent capillaries, and thus transudation and absorption in different parts of the same network can be readily explained. In the intestinal capillaries the larger and deeper vessels supply the secretory structures and the smaller and more superficial vessels are the absorbants.

Physiologists usually infer that some healthy capillaries are more permeable than others, and here, again, they are content with inferences rather than proofs, because they find a greater transudation, say, from the capillaries of the liver than from those of the foot; but they forget that in the foot, compared with the liver, the capillary bed to each arteriole is much less, the velocity is enormously greater, and when the foot is moving the pressure may be less, and the exuded lymph is moved on as quickly as it is formed. Surgeons often find the permeability of the capillaries of an immobilized limb too great to their liking. In filtration the concentration of the filtrate is greater at lower than at higher pressures, hence the lymph from the liver capillaries often contains 6 to 8 per cent. of albumen. In alcoholics the arterial blood pressure falls, the diastolic pressure in the heart rises, the right ventricle gets dilated and tricuspid valve incompetent, and the blood is thus dammed back in the liver. From the fall in the arterial pressure, the pressure in the portal vein also falls, and consequently there is a fall both in the velocity and filtration pressure in the portal capillaries; this gives rise to a concentrated transudate both in albumen and leucocytes which soon leads to a multilobular cirrhosis. This obstructs the portal circulation, which raises the pressure in the intestinal capillaries and gives rise to increased filtration from them. The liver becomes of a deep purple colour when the circulation in it is sluggish from any cause, owing to the blood being surcharged with CO_2. The indications for treatment in these cases are: Stop the alcohol, lessen the input of fluid, and raise the arterial pressure. An intestinal antiseptic and a colon bacillus vaccine are often useful. There is no use in washing them out with any mineral spring, unless it be some concentrated saline which runs through the intestinal tract without being absorbed. In my opinion a dose of Epsom or Glauber salts in a smal quantity of water is better than any imported saline.

In 1904 Dr. George Oliver published his admirable work on the tissue lymph circulation. He showed that during the first hour of digestion there was a rise in the blood pressure—arterial, capillary, and venous—with a flow of lymph into the tissues. His conclusions were:

1. That the food constituents themselves (proteids, fats, and carbohydrates) do not possess the power of starting the mechanism by which lymph is dispensed to the tissues through the body.
2. That Nature, however, associates with our foodstuffs small quantities of very active substances which bring into play that mechanism, though these substances themselves are practically devoid of food value, and that man frequently increases this natural lymph by the use of salt, and beverages containing bodies which also incite the flow of lymph. Such bodies as uric acid, creatin, creatinin, xanthin, glycogen, and sodium chloride perform an important function in nutrition, for during digestion they act as distributors of lymph to all the tissues—an office which the nutrient constituents themselves (proteids, fats, and carbohydrates) are incapable of discharging.

He associated the action of these lymphagogues with a rise in the capillary pressure, and not, like Heidenhain, to any specific excitation of the secretory activities of the endothelial cells. He also accepted the dictum of Starling and other physiologists, that an increased lymph concentration was due to increased permeability of the capillaries, and here I differ from them. No doubt capillaries damaged by inflammation or by any solution of continuity will readily permit of the exudation of albumen, but the variations in the quantity and concentration of lymph from healthy capillaries is readily accounted for by variations in the capillary pressure and velocity. When there is great pressure and high velocity, there may be great transudation of thin lymph from the efferent or distributing capillaries, and an equally rapid absorption by the collecting or afferent capillaries. When the pressure and velocity are low, as in the liver, you get a concentrated lymph and practically no absorption. The interchange of gases takes place by diffusion.

The Venules.

These little veins are smooth, capacious vessels which offer little or no resistance to the circulating blood. They are slightly elastic and attain their maximum distension at a low internal pressure. They are contracted by cold and mechanical stimulation and dilated by heat. The energy of the blood in them is a compound of pressure and velocity, and depends on (1) the energy transmitted through the capillaries, (2) the hydrostatic pressure, and (3) the aspiration of the thorax. There is a gradual fall of pressure from the venule to the right auricle. Although the circulation of the blood has been known for over 300 years, I believe it was left to me to discover that the venous blood runs more quickly up the hill than it does down it, and this is due to the increased energy in the

arteries and capillaries in a dependent limb. We will now consider the principal local circulations.

THE SPLANCHNIC AREA.

We have already referred to the circulation in the liver. The arterioles of the digestive tract are very muscular and well supplied with vasomotor nerves of the constrictor type. These nerves and vessels are the chief regulators of the arterial blood pressure. The capillaries are very fine, and form an exceedingly close network. The resistance to the outflow is very slight, except in cases of portal obstruction: hence the velocity is usually great and the lateral pressure slight. This is just what would be expected in vessels where absorption is an even more important function than secretion. The bright pinkish hue affords a marked contrast to the dark purple liver where the circulation is sluggish.

When you get complete vasomotor paralysis, as in severe shock, the greater part of the blood of the body may drain into the splanchnic area. From this there may be all degrees, down to a slight paresis, which has been described by Albert Abrams under the title "cardio-splanchnic paresis." Witness the pale, pasty, flabby youths who are often treated for anaemia, but whose haemoglobin is not deficient, and when they are laid flat the colour of the face at once improves. These cases are more frequently young males than females, and I believe in the majority of cases the paralysant is nicotine. There is occasionally a deficiency of lime salts and slight albuminuria. These cases are closely allied to orthostatic albuminuria, or the so-called albuminuria of adolescence, where, in addition to cardio-splanchnic paresis, there is always a deficiency of lime salts. From the very time that this condition began to attract attention I taught that it was entirely circulatory in origin, and was quite independent of any disease of the kidneys. When resting the patient should be quite horizontal, with a low head. When erect he should not stand or loll about, but take plenty of exercise and wear a tight abdominal belt. He should get the glycero-phosphate or lactate of lime, and, when a purgative is required, sulphate of magnesium. He should be on a liberal dry diet, consisting of beef, mutton, chicken or fish, vegetables, milk puddings, a little tea, coffee or buttermilk, little or no salt, and no acids. In all these cases tobacco and alcohol should be forbidden.

In these cases there is often an attempt on the part of Nature to compensate for the cardio-splanchnic paresis by contraction of the arterioles of the skin and muscles, and you can roll the arteries of the extremities, like thick elastic tubing, under your fingers. This raises the general arterial pressure, but it works mischief by further congesting the splanchnic area. There is often epistaxis, and there may be slight haemoptysis without any disease of the lungs. General massage, the Aix douche, or Nauheim baths are beneficial; but whatever course of treatment be adopted, physical exercises must not be neglected, and certainly the patient must not be drenched with mineral waters; all such are abominable in these cases.

Each infective process requires its own specific treatment, but in all such cases it is well to keep the bowels open and as aseptic as possible. Sour buttermilk is a good antiseptic for the intestinal tract.

THE ARTERIOLES AND CAPILLARIES OF THE KIDNEYS.

We have just seen how the deficiency of lime salts in the blood, and the increased pressure in the abdominal aorta and inferior vena cava gives rise to orthostatic albuminuria when there is paresis of the splanchnic vessels, but these conditions are quite different in granular kidneys. Here the muscular arterioles, which are well supplied with vaso-constrictor nerves, are contracted and protect the capillaries of the glomeruli from any excessive pressure, but the high potential in the aorta drives the blood through the arterioles with great velocity, and this energy is expended in the Malpighian corpuscles, partly as pressure and largely as velocity; hence we get a large dilute filtrate. The glomeruli are further protected by the endothelial lining of Bowman's capsule, which in these cases becomes much thickened, and is not easily permeable to the large molecules of albumen, but readily allows the transudation of water and salts. There is nocturnal diuresis, because in the horizontal posture, although there is a slight fall in the general arterial pressure, the arteries of the kidneys are dilated and the total amount of blood circulating through them increased. In these cases the lime salts are usually excessive, and hence milk is not a suitable diet, though many medical men think it is the only proper diet in all diseases of the kidneys. The nitrogenous elements must be cut down and salt almost eliminated from the diet. The patient can have plenty of hydrocarbons, carbohydrates, fruit and vegetables, except such as contain oxalic acid. Medicinally, he should have the benzoates, the citrates, and any decalcifying agents.

In acute inflammatory disturbance of the kidneys the velocity in the capillaries is diminished and the lateral pressure relatively high; hence we get a concentrated filtrate. In healthy capillaries about a fourth, or less, of their pressure is transmitted directly to the surrounding tissues in which they are imbedded, but in the large congested, chocolate-coloured kidneys, when the capsule is stretched to its utmost capacity and the kidneys are nearly twice their normal weight, nearly the whole of the arterial and capillary pressure is transmitted and stops all secretion. The only salvation for such kidneys and their possessor is to freely incise the capsules and kidneys, as was ably and persistently advocated by the late Reginald Harrison. When the tension is relieved the secretion at once starts. A similar condition is often seen in cases of adenitis.

In acute tubular nephritis the lime salts are not, as a rule, excessive; hence, from this point of view, milk is admissible, and it has also the advantage of being poor in chlorides, but it is far too nitrogenous to be commended. I prefer fruit and carbohydrates, on which the patient can subsist for a long time. Medicinally, the following drugs are useful: Antimony, the benzoates, the citrates, the acid tartrate of potassium, saline purgatives, hot-air baths.

THE ARTERIOLES AND CAPILLARIES OF THE SKIN.

The arterioles are very muscular and well supplied with vasomotor nerves, chiefly of the constrictor type; frequently they are so contracted that the capillaries are almost empty, and in cases of local syncope quite empty, and the pressure and velocity fall to zero. These vessels are reciprocal to those of the splanchnic area. Usually when one set contracts the other dilates, and thus the mean arterial pressure is regulated; and they are also largely concerned in regulating the temperature of the body and the watery exhalations from the skin. When there is general vasomotor paralysis the blood travels in the direction of least resistance and largely accumulates in the splanchnic area; but if in addition you have general plethora it also stagnates in the extremities and other dependent parts and gives rise to general oedema. When there is merely local vasomotor paresis, such as that produced by a sinapism, the capillaries are engorged and the pressure and velocity increased. Witness also the effects following the application and removal of an Esmarch's tourniquet. Of this method of treatment Dr. William Ewart has made good use in rheumatoid arthritis.

The capillaries form an exceedingly close network in the corium and send loops up into the papillae, and the pressure and velocity vary enormously. After a liberal meal—especially one containing ingredients which dilate the arterioles, raise the diastolic arterial pressure, and thus provide an abundant supply of blood to, with increased pressure in, the capillaries—there is a free outpouring of lymph. In my opinion, a good deal of the work which has been done in the so-called digestion leucocytosis has been rendered worthless by the work of George Oliver on the tissue-lymph circulation. Those observations were made on the blood obtained from a prick of the finger, and this consists of a mixture of blood and lymph. The white cells are increased—the increase being in the lymphocytes—in proportion to the dilution with lymph, and the red cells are proportionately diminished. If the lymph be compressed out of the tissues and then a drop of pure capillary blood be obtained, there will be found in it an increase of red cells, and the white cells will be much less than in the mixed blood, and scarcely any more than would be obtained by an ordinary puncture three or four hours later, when the lymph had been reabsorbed. This so-called digestion leucocytosis is therefore no evidence of any increase of white corpuscles in the circulating blood,

but merely that lymph has transuded from the vessels, and in this lymph there is a considerable number of lymphocytes, probably obtained from the tissues as well as from the capillaries. There is no doubt a digestion leucocytosis, but it is not what has been usually described.

Baths.

These arterioles and capillaries offer an extensive area for the practice of the bath physician; if he cannot here cultivate fresh fields and pastures new, he is not worth his salt. A little washing does every one good, especially those who only take an annual tub. The nature of the bath depends on the objects which you want to accomplish. Heat relaxes and cold contracts the arterioles, effleurage causes dilatation, but pétrissage and tapotement rather contract the skin arterioles and dilate those of the muscles. The light or hot-air bath—if not overdone—followed by gentle massage and a cool douche, has often a very stimulating effect. The warm alkaline bath has a sedative, and the carbonic acid bath a stimulating, effect on the nerve endings. In the Nauheim bath the increased specific gravity has a primary effect of raising the peripheral resistance, which is afterwards followed by reaction, and the effervescence has a stimulating effect, but it is a piece of absurd twaddle and unreasoning credulity to attribute any specific effects to the chloride of calcium; fortunately this salt is not absorbed, otherwise it might work irreparable mischief. Baths of all kinds are, I think, powerful agents for good or evil, and should be used with care and discrimination. In advanced arterio-sclerotic changes they do good in great moderation, but it is extremely easy to work mischief. There is no use in telling your patients, as is often done, that they will feel the benefit of the baths when they return home; this, in my opinion, is equivalent to saying that the patient would have been better without the baths as administered at your particular spa. Any beneficial effect should be observed under administration. I do not like this hope deferred, and I think under such circumstances the patient on his return home should thank God for his escape.

The Arterioles and Capillaries of the Muscles.

The arterioles are supplied with vaso-dilator nerves and are thus reciprocal to those of the splanchnic area. The capillaries are arranged in a fine longitudinal network, from which lymph readily transudes. Dr. George Oliver has shown that during the height of the digestive flow of lymph tension exercises of the muscles do not further raise the arterial pressure. The lymph in the limbs is not concentrated and is readily absorbed. Sir Lauder Brunton and Dr. F. W. Tunnicliffe showed that after the cessation of muscular contraction the intermuscular arterioles dilate and thus lessen the resistance. Healthy muscular exercise is necessary for the maintenance of a vigorous circulation, and when such exercise cannot be taken, we should use such substitutes as massage, passive exercises, and douches.

The Cerebral Vessels.

As the circulation in the brain is carried on in a closed box, and owing to the atmospheric pressure, the total amount of blood varies very little. The arteries and arterioles are thin-walled, the inner coat is well formed, there is a moderate amount of muscle fibre in the middle coat, the external coat is rather defective, but it is strengthened by a lymphatic sheath. The presence of vasomotor nerves is not generally acknowledged, but Dr. Alexander Morison says that he discovered them. Owing to stress and strain these vessels are liable to atheromatous and calcareous degeneration, and in the smaller vessels there are frequently miliary aneurysms. The capillaries are small, short, well-supported vessels, which seem to be able to bear a considerable amount of strain. When the body is inverted—not a desirable method of treatment for any affection, except that of syncope—the carotid arteries contract down to about half their usual calibre, and thus the quantity of arterial blood is lessened, but its kinetic energy increased. The arteries are subjected to great strain from higher potential, but in the capillaries this is largely converted into velocity. The cerebro-spinal fluid, which represents the lymph, is very deficient in proteid, from which we may infer that under ordinary circumstances the capillary velocity is relatively great and pressure slight. In cases of meningitis the proteid in the fluid is increased. In alcoholic plethoric individuals there is frequently a deficiency in lime salts, transudation takes place into the ventricles, and so serous apoplexy is not such an uncommon event as textbooks make out. In cases of high arterial pressure the arteries are very liable to atheromatous and calcareous degeneration; such cases are often terminated by the rupture of a degenerate vessel or miliary aneurysm.

The treatment is that of the cause; frequently a timely free blood-letting saves the patient. Turkish baths are especially to be condemned in such cases, and other forms should only be used with great circumspection.

The Coronary Vessels.

The arteries and arterioles which supply the heart closely resemble the cerebral vessels in being thin-walled, rather deficient in muscular fibre, and in having very few, if any, vasomotor nerves. They are also exceedingly prone to atheromatous and calcareous degeneration of the intima. Newell Martin, Roy and Adami, and Alexander Morison found some evidence of vasomotor nerves, but, on the other hand, Schäfer, Dixon, Brodie, and Elliott have failed to get any response to adrenalin, which acts on all muscular fibre innervated by the sympathetic. Recently Dr. W. H. Harvey has found that the pituitary gland contracts these vessels and causes atheroma in them. These arteries are terminal, and this would seem to be one of the very few mistakes which Nature has made, as we might be inclined to think that here, if anywhere, a free anastomosis is desirable. We must, however, remember that the two sides of the heart are two distinct organs only linked together for convenience and mutual support. Perhaps, also, Nature is more concerned with the species than with the individual, and to her the loss of a person from a blocked coronary artery is a matter of no great moment. The terminal portions of the arteries which are imbedded in the muscle remain fairly healthy as a rule, so when a coronary is blocked the heart may be supplied with blood from the venous side. In cases of tricuspid stenosis the coronary veins are much dilated, and form regular sinuses in the cardiac muscles.

I have dealt with the treatment of chronic degenerative lesions of the heart and with the pulmonic circulation in previous addresses.

I have not spoken about the climate because in this country we have got to take it as we find it, but, such as it is, if it were not for the greed of the hotel proprietors, it could be had at a very reasonable price. Moreover, there are the advantages that the atmosphere is frequently washed, the sewers flushed, and the sanitation, as a rule, perfect.

Reference.

[1] British Medical Journal, 1906, vol. ii, p. 401.

THE CRESCENDO MURMUR OF MITRAL STENOSIS.

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In the extensive investigation of the physical signs and symptoms of cardio-vascular disease which is going on at the present day the rhythm of the crescendo murmur of *a-v* stenosis is apparently playing a very important part. Theories to explain perverted action of the heart are being promulgated; interpretations of jugular pulse tracings, normal or abnormal, deductions for prognosis, and indications for treatment are being made, books are written, and papers published, all being based in part or wholly on the supposed fact that the crescendo murmur of *a-v* stenosis is presystolic or auricular systolic in rhythm. As I have been of the opinion from 1897, when I first wrote on the subject, and am more strongly of the same mind now, that this theory has not only never been proved, but that it is fallacious, I think it worth while to remind observers of the alternative view, and to draw attention to some recent work, because it provides most valuable evidence as to the actual time of onset of this characteristic murmur.

In the first place, however, I should like to review the main theories concerning the rhythm of the crescendo murmur of mitral stenosis (for convenience I will speak of

mitral stenosis only as being the *a-v* lesion most commonly met with).

RHYTHM OF THE CRESCENDO, OR PRESYSTOLIC MURMUR.

There are two chief theories:

1. *That the murmur is a direct current murmur, and occurs whilst blood is passing from the auricle into the ventricle, and is caused in part or wholly by systole of the auricle.*

2. *That it is a regurgitant murmur, and due entirely to systole of the ventricle.*

Definition of the Murmur.

To be quite clear, it will be well to define exactly what is meant by the crescendo murmur. It is that murmur which has for its essential characteristics a pitch which rises progressively, and a force which increases progressively, and a sudden termination with an abrupt first sound when at its highest pitch and maximum vigour. It only occupies the terminal part of the interval between the second and first heart sounds, and is probably not more than 0.1 second in duration, and generally less than this. It may occur alone, or be continuous with a true diastolic mitral murmur, with a true systolic murmur, or with both these murmurs.

The A-S or Presystolic Theory.

To the writings of the late Sir William Gairdner is due in great part the almost universal acceptance of this theory at the present day. He assumed from the undoubted position of the murmur in relation to the first sound of the heart that it occurred just before *v-s*, and was coincident in time with *a-s*. But he had no indisputable proof to support his belief that the murmur must be coincident with *a-s*, the only universally acknowledged fact being that the murmur precedes and is terminated by the first sound. Nevertheless, the explanation seemed to be very obvious and appealed successfully to minds of clinicians, as compared with the *v-s* rhythm theory which was supported by Ormerod, Barclay, and Charlewood Turner in the Seventies, and by Dr. Howship Dickinson in 1887.

Gairdner's Case.

In 1893 Gairdner published the notes of a case of tricuspid stenosis which he had followed up clinically and seen *post mortem* in 1872, and which he and his disciples considered to be proof positive that the crescendo murmur is *a-s* in rhythm. I have criticized this case before, but I should like to refer to it briefly again, first, because, even if Gairdner was correct in believing that the crescendo murmur was synchronous with *a-s*, the case affords strong evidence in favour of the *v-s* rhythm of the murmur in mitral stenosis; and, secondly, to point out that there is another possible explanation of the causation of the murmur which altogether destroys the value of the case as the definite proof of the *a-s* rhythm theory which Gairdner believed and which nearly all modern observers assume it to be.

Clinically the case showed a murmur which began "immediately after the second sound, continued diminuendo throughout the pause, and then went on crescendo up to the first sound, at which it stopped abruptly." The obstruction was caused by a pedunculated tumour in the right auricle, which, from its position, was forced during auricular systole into the tricuspid orifice and interfered with the flow of blood through this valve. In Gairdner's opinion the tumour "could only have been obstructive during ventricular diastole and auricular systole, and could by no possibility become the physical cause of a murmur of regurgitation." He also further believed that the murmur occurred "under circumstances which render it impossible to suppose that there should have been any difficulty or delay in the closure of the valve, any more than in a normal heart. And even had there been regurgitation, the obstacle, not being fixed but movable, would not have been in the way any more than the ball valve of a syringe is in the way of the current generated by suction."

In the first place, then, let us assume that Sir William Gairdner was correct in his supposition that the terminal part of the murmur, namely, the crescendo, rising-pitch portion, was caused, in part or wholly, by the contraction of the auricle, and we must ask the question, How were the characteristics of the murmur, namely, rising pitch and increasing force, produced?

The rising pitch could have been produced, as I shall explain later, by the tumour being forced, partly or wholly by the systole of the auricle, further and further into the orifice of the valve, until it finally completely obstructed the latter. Whilst this was going on, that portion of the murmur which was undoubtedly produced by the obstruction to the passage of blood into the ventricle, would become progressively of higher and higher pitch synchronously with the progressive obliteration of the blood-way into the ventricle, and would terminate when at its highest pitch. If not in this way, how was the rising pitch produced?

My point can be seen at once, if whilst air is being sucked in or blown out through the pursed-up lips the tip of the middle finger be more or less rapidly used to block up the air passage in the lips. A rising pitch "murmur" is produced at once. If the air be blown or sucked with increasing force during the insertion of the finger a complete crescendo character is at once imparted to the "murmur."

This explanation of the production of the crescendo murmur in Gairdner's case, paradoxical though it may seem, is strong evidence in support of the early *v-s* rhythm of the crescendo murmur of mitral stenosis, as I shall show later. The crescendo or increasing force of this murmur must, if the latter were due to *a-s*, have been caused by a progressively vigorous, suddenly terminating contraction of the auricle.

But there is another possible explanation of the causation of Gairdner's crescendo murmur, and so, adopting a legal method, I will submit alternative pleadings. There are two disputable points in Gairdner's interpretation of the significance of the case:

(1) There is no analogy between the ball of a ball-valve syringe and the tumour in the auricle which *interfered with the normal action of a flap valve.*

(2) It is not impossible that the crescendo murmur was caused by blood escaping through the tricuspid valve at the onset of ventricular systole before the tumour, which was forced into its orifice by auricular systole, could be dislodged and the valve curtains come together in competent apposition. I may illustrate this criticism by the simple experiment of placing the tips of two of one's fingers into the mouth between the lips whilst the atmospheric pressure in the mouth is increased, and then suddenly withdrawing or blowing out the fingers and allowing the lips to come together and prevent the escape of air. During the withdrawal of the fingers a greater or less amount of air escapes through the lips, according to the way the fingers are removed from the lips, and gives rise to a bruit, which is of ascending-pitch type, owing to its being produced at an aperture of rapidly and progressively diminishing area. It also terminates abruptly with the final closure of the lips, which prevents any further escape of air. The lips in this experiment represent the valve curtains, and the tips of the fingers the foreign body.

Whether Gairdner's interpretation of the rhythm of the murmur or my own be correct, both afford strong evidence in favour of the early *v-s* rhythm of the crescendo murmur of mitral stenosis, because they both depend on the fact that the rising-pitch characteristic was imparted to the murmur at a closing valve orifice.

The V-S Rhythm Theory.

Dr. Howship Dickinson in 1887 wrote an important paper on "The Presystolic Murmur, falsely so-called." In this paper, Ormerod's and Barclay's views were supported by very powerful arguments, derived from much clinical experience. It is impossible to do justice to Dickinson's views in a short abstract of his paper, but I may note that one of his strongest reasons for believing that the "presystolic" is really a *v-s* murmur is the frequently repeated observation, that "if a finger be pressed between the ribs, particularly in a thin person and when the heart is not too rapid, and if, at the same time, the double stethoscope be adjusted to the murmur, the beginning of the murmur will be found synchronous with the beginning of the impulse."

As Dickinson looked upon the "short sound which immediately follows the special murmur—up to which the latter runs—as marking the conclusion of ventricular

systole," it is not to be wondered at that his view was not accepted.

I was brought up on the *a-s* rhythm theory, and accepted it until in 1895 I was converted to the rival theory as the result of experimenting in the production of imitation murmurs with a piece of drainage tubing. I found that I could produce a perfect imitation of a crescendo, rising-pitch murmur by blowing with increasing force through a piece of drainage tubing of about $\frac{1}{4}$ or $\frac{1}{3}$ inch diameter of lumen and obliterating the lumen of the tube with the fingers, or by bringing the teeth together on the tube whilst doing so.

As this simple experiment is the key to the whole question, giving, as it does, a bedrock of fact to build upon, I will state precisely what happens.

PRODUCTION OF AN IMITATION RISING-PITCH, CRESCENDO-FORCE MURMUR.

A sound of crescendo force, rising pitch, and abrupt cessation at the point of maximum vigour and highest pitch is produced if you blow with increasing force through a piece of drainage tubing, and obliterate the lumen of the tube whilst doing so. A similar series of events occurs with water instead of air as the sound-producing medium, as can easily be seen with a Higginson syringe without its nozzle, a binaural stethoscope, and the washbasin of a bathroom.

Fig. 1.—A, Mitral valve unclosed; B, Mitral valve closed; C, Mitral valve incompletely closed.

This "crescendo" murmur varies as regards its force, pitch, tone, and length of duration, according to the force used to produce the murmur, the diameter of lumen of the tube, the capacity for vibration of the wall of the tube, and the rapidity of the obliteration of its lumen. Similar variations of the murmur occur, *mutatis mutandis*, in the *a-v* valves. The murmur is identical in essential characteristics with crescendo murmurs heard in mitral and tricuspid stenosis. A similar sound can be produced in a similar way by phonating the word w-h-i-p through the lips, or by placing the tip of a finger between the lips into the mouth, when you raise the atmospheric pressure in the mouth, and then withdrawing the finger more or less suddenly. I can find no other way than by obliterating an orifice at which a murmur is produced, by which you can can impart the progressively rising-pitch character to the murmur.

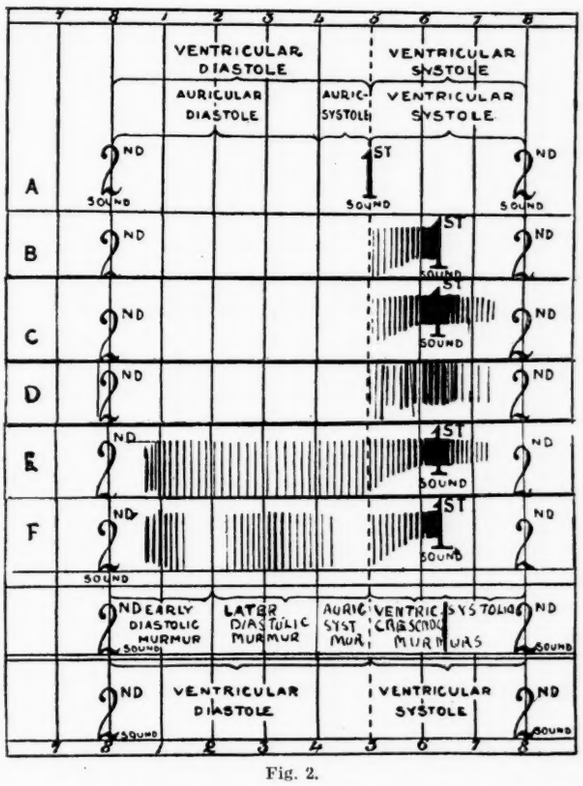

Fig. 2.

The rising-pitch character of the crescendo murmur of *a-v* stenosis must, therefore, with the greatest probability, if not absolute certainty, be acquired by the act of the valve closing while a murmur is being produced at it.

Gairdner's observations, even if allowed to be accurate, support in a very suggestive way the "closing-orifice" production of the murmur, and also the admissibility of the principle of the "closing-orifice" murmur being applied to the intracardiac conditions.

The character of the crescendo murmur will vary in mitral stenosis according to the condition of the valve. If there be any vibration of the curtains during regurgitation, a rough blubbering or burring sound, will be produced; if the curtains be entirely rigid, only a smooth crescendo rising-pitch sound will be heard.

If the above explanation of the mechanism of production of a rising-pitch murmur in mitral stenosis be fallacious, I shall be glad to be corrected.

Assuming that the murmur be so caused, it could arise during the direct flow of blood through the heart, that is, from *a* to *v* during *v-d*; or by regurgitation, that is, from the *v* to *a* during *v-s*. A stenosed *a-v* valve is of very different character to a normal valve; it is almost invariably so stiffened or thickened that it requires more force to close it than is necessary to float the thin mobile normal *a-v* curtains into competent apposition. Therefore a stenosed valve requires more *i-v* pressure to close it than does a normal valve, and this can only be produced at a later phase of *i-v* pressure than that at which the normal *a-v* valves are closed. If the diseased valve remains opened during any part or the whole of increased *i-v* pressure—that is, *v-s*—blood will regurgitate through it and cause a murmur unquestionably systolic in rhythm. If the valve is so distorted and stiffened by disease that the *i-v* force cannot close it at all, a *v-s* murmur is heard throughout the systole of the ventricle; but if the valve is in such a condition that it only requires rather more *i-v* force to close it than a healthy valve does, it will be closed at a later period of *v-s* than normal, and during this delay blood will escape back into the auricle and cause a murmur to which a rising-pitch character is imparted by the act of closing of the valve. The terminal abrupt first sound is probably caused by the sudden and forcible impact of the hardened, thickened jaws of the diseased valve.

The mitral valve is closed in health when the *i-v* pressure rises above that of the *i-a* pressure through the contraction of the ventricle. In mitral stenosis there is no reason to suppose that anything different happens. No one will maintain that the auricle can raise in the ventricle a higher pressure than that in its own cavity. If any one should hold this view, the onus of proof rests with him.

The preceding arguments can be restated in a few lines: The rising-pitch characteristic of a crescendo murmur is caused at a closing *a-v* valve; the *a-v* valve is closed by *v-s*, therefore the murmur is *v-s* in rhythm.

Careful, and certainly more than a cursory, consideration of this question—it occupied very closely my own thoughts for two years before I published my views—and the taking into account of the clinical variations of the murmur and the pathological conditions of the stenosed valve, auricle, and ventricle; and, finally, both the explanations of the production of the murmur in Gairdner's case will, I venture to think, convince others of the fact that it is the ventricle and not the auricle which alone can produce the crescendo murmur.

APPLICATION OF THE EARLY *V-S* THEORY TO THE EXPLANATION OF THE CHIEF AUSCULTATORY SIGNS OF MITRAL STENOSIS.

Early Stage—Accentuated First Sound Alone.—The thickened margins of the diseased valve are connected at

their junction by mobile hinges, which allow the jaws of the valve to snap together easily and early in *v-s* and before blood has time to regurgitate.

Later Stage—Crescendo Murmur Alone and Accentuated First Sound.—The mobile hinges become stiff and the murmur is formed by blood regurgitating under pressure through the valve whilst its stiffened jaws are being closed by the rising *i-v* pressure developed at an abnormally later stage of *v-s*. (See accompanying diagram, Fig. 2, published in 1899.) An accentuated first heart sound terminates abruptly this murmur, and is due to the collision of the thick hard jaws which guard the stenosed orifice (Figs. 1 and 2, B).

Crescendo Murmur Continued by Ventricular Systolic Murmur.—In this case the former bruit is produced in the same way as when it is heard alone, but the coaptation of the jaws is imperfect, and fails to make the valve watertight or blood-tight, so a small stream of blood continues to regurgitate through one corner or side of the valve orifice whilst *v-s* persists, and gives rise to the uniform systolic murmur. A more or less abrupt first may divide these two murmurs (Figs. 1 and 2, C).

Crescendo Murmur and Accentuated First Sound, Alternating Systolic Murmur and less marked or no First Sound.—The occurrence of a crescendo murmur and sharp sound indicates that the *i-v* blood pressure is raised by *v-s* sufficiently high to produce a transient regurgitant murmur before it closes the stiff valve with a snap; whilst the production of a *v-s* murmur, but no sound, means that the heart beat is weak, sufficient pressure is not generated to close the valve anything like completely, no crescendo murmur or abrupt first sound can be produced, and an ordinary *v-s* regurgitation goes on, producing the uniform, true, mitral systolic murmur. There is no change of rhythm with the alternation of these murmurs, both occurring during *v-s*, and within a few beats of a heart, often as a result of change of position from lying down to sitting up. The final change to an accentuated first sound only, if a patient walks about, is due to the increased force and quickness of beat closing the valve before regurgitation can take place, or producing a crescendo murmur of too short duration to be heard. This point may also be illustrated by the well-known clinical fact that an overworked ventricle in mitral stenosis, which can only contract feebly and cause a systolic murmur whilst the patient is up and about, will often, on rest in bed, with or without drugs, recover its strength again sufficiently for the production of a crescendo murmur.

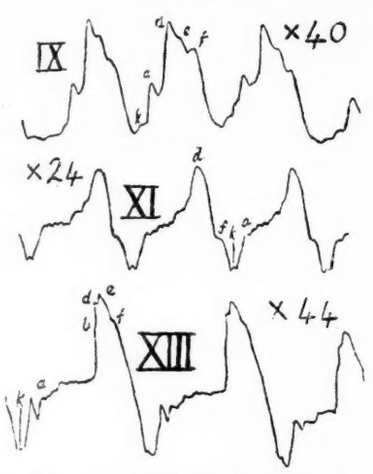

Fig. 3.—IX, Loud, rough murmur at apex, commencing at the second sound and becoming very loud and harsh towards its conclusion, and leading up to the first sound. XI, Long, very loud, presystolic bruit of rough, grinding quality, commencing immediately after the second sound, and leading up to the first sound. XIII, Rough but not very loud bruit, commencing immediately after the second sound, and leading up to the first sound, accompanied by a thrill. A, Auricular systole; E, Closure of semilunar valves. (Reproduced by kind permission of Dr. Galabin and Editor of *Guy's Hospital Reports*.)

Diastolic, Crescendo, and Systolic Murmurs Forming One Long Continuous Bruit.—In this case the diastolic murmur is formed by blood being driven through the stenosed orifice, under those forces which fill the ventricle and by the contracting auricle (when it is able to join in); the crescendo murmur, by blood regurgitating through the closing valve during the earlier half of *v-s*; and the systolic murmur, by blood escaping through a leak in the somewhat imperfectly closed valve during the latter half of ventricular contraction. The two last murmurs may be separated by the abrupt tapping first heart sound, caused by the impact of the jaws of the orifice of the closing valve (Fig. 2, E).

The *systolic murmur* alone is caused by the *i-v* pressure being unable to coapt the edges of the diseased valve during any part of *v-s* (Fig. 1, A, and Fig. 2, D).

The *ordinary diastolic* mitral murmurs, early, middle or late, always decrescendo, are produced as indicated in the preceding paragraph but one.

An *accentuated second sound* heard over the pulmonary area will always be heard in mitral stenosis.

The tone of any murmur will vary according to whether it is produced by a fluid vein, or whether a diseased valve is thrown into vibrations. In the latter case the murmur will be harsher or more "blubbering."

It will be seen from the above that, in my opinion, a crescendo murmur in mitral stenosis means efficient contraction of the left ventricle, and is of good prognostic import.

Does the *a-s* rhythm theory explain these points as simply or as satisfactorily?

There are a couple of points made by *a-s* theorists in support of their views to which I should like to refer.

Visible Pulsation in the Second Left Intercostal Space.

This argument was especially used by Balfour. He stated that in many cases of mitral stenosis the *appendix of the left auricle* is greatly dilated and lies close to the anterior chest wall in the second left intercostal space, and when this is the case, contraction of the auricle against the chest wall may be felt by the finger to coincide with the auricular systolic (presystolic) murmur heard with the stethoscope.

But it has been shown conclusively by various observers that the left auricle never occupies the position in mitral stenosis described by Balfour. It lies well back and away from the chest wall, and its contraction never can be felt, but the pulsation to which Balfour refers is caused by the movements of the *base of the right ventricle*, which lies behind the second costal interspace on the left side of the sternum. Keith says that the left auricle is behind the ascending aorta.

Balfour's clinical evidence, taken with the pathological investigations of other observers—who, I may mention, are all upholders of the presystolic theory—yields an important fact *against* and not in favour of the theory which he advocated. This evidence, in truth, supports the early systolic rhythm theory.

Again, Sansom and other observers argued that the fact that the crescendo murmur is heard and felt to exactly precede the maximum of the cardiac movement is proof that the murmur is *a-s* in rhythm, whereas it is really in favour of the early *v-s* rhythm.

There is one question which I have previously asked, and as I have never received any answer to it I will put it again. Why is not a crescendo murmur heard at the aortic orifice if that heard in mitral stenosis be caused by blood being forced by auricular contraction through the narrowed valve? It is not unreasonable to wonder why the much stronger ventricle never produces any suspicion of a crescendo murmur when it drives blood through an entirely analogous obstruction—namely, that of stenosis of the aortic valve. Here it must be noted that the action of ventricular systole is that of a gathering force, and that the blood is forced through the aortic valve with increasing vigour.

Here, then, we have practically an ideal condition for the production of a crescendo murmur, and yet one is never produced. On the other hand, it is allowed that a crescendo murmur is produced at times by blood regurgitating through an incompetent aortic valve (Flint's murmur). I have never seen an explanation of how it is that no crescendo murmur is heard in aortic stenosis offered by any supporter of the presystolic theory.

Cardiographic Evidence.

If the early *v-s* theory of the crescendo murmur be true, it is obvious that the first sound of the heart will occur at a later phase of *v-s* than is normally the case, for there will be contraction of the ventricle for a longer or shorter time before the closure of the valve; in other words, there will be a lengthened presphygmic interval (Fig. 1, B). There will also be a longer or shorter time of preliminary movement of the apex beat, during which blood is slipping back through the open valve, before the strong impulse

denoting the forcible contraction which drives blood through the semilunar valves. This preliminary movement, synchronous with blood passing back through the diseased valve, and with a crescendo thrill, when one is present, ought, with a good cardiograph, moving more rapidly than those much used now, to impart to the cardiogram a more or less gradual rise, to be terminated suddenly by a wave and notch caused by the jerk of the closure of the stenosed valve, and from this point there ought to be a more vertical upstroke like that of a normal cardiogram. If a crescendo thrill be present the preliminary gradual rise ought to be more or less wavy or serrated according to the fineness or burring character of the thrill. With a prolonged ordinary systolic murmur of mitral regurgitation, and no closing movement of the diseased valve, there will be an abnormally long presphygmic interval, and the upstroke of the cardiogram ought to be abnormally gradual throughout its whole extent.

Many good cardiograms taken from cases of mitral stenosis to prove the *a-s* theory show these points clearly. Thus, Fig. 3 is a reproduction of three adjacent tracings from Galabin's paper on the subject. There are several others of similar nature. The letter *a* is supposed to indicate *a-s*. If it is, what is all the irregularity in XI and XIII tracings before the final upstroke due to but ineffective ventricle contraction? The clinical notes appended to the figure are taken from Galabin's paper.

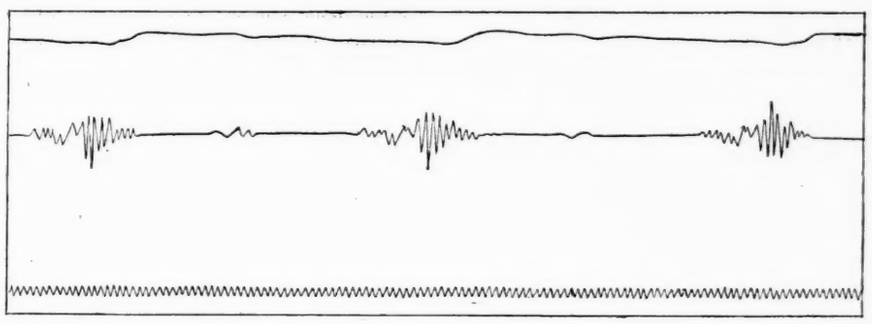

Fig. 4.

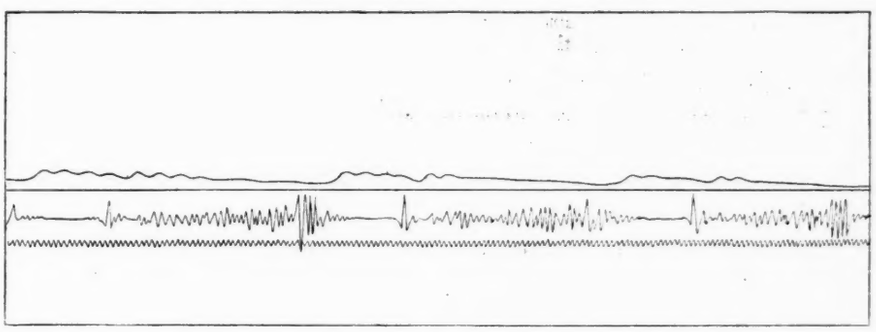

Fig. 5.

From cases of mitral stenosis. In these figures the upper curve is the carotid pulse, the middle the murmur, and the lowest the time record (0.01 second). The straight line in Fig. 5 was caused by a piece of dust. (Reproduced by permission of the publishers of *Pflüger's Archiv.*)

So much for the early ventricular systolic rhythm theory of the crescendo murmur of *a-v* stenosis, which appears to me to be so unquestionably sound that it has never been shown to be fallacious, and is usually ignored.

I am pleased to see that Dr. Mackenzie, who has known my views from the time I first published them, has at last come to the conclusion that a brief crescendo murmur can be caused by slight regurgitation through the mitral orifice at the beginning of ventricular systole; but he still thinks that it is indisputable that auricular systole can produce a pre-systolic or crescendo murmur.

Recent Investigations.

Through close attention to other work I have not been able to follow all the work in recent years on cardio-vascular investigation, but I have read a certain amount and cannot see any new and indisputable evidence in favour of the *a-s* theory. Many of the observations are not as satisfactory from a scientific point of view as they might be, inasmuch as the tracings often show too little detail and are taken on too slowly recording surfaces with time marks of 0.20 of a second. In some tracings there is no time record at all. Much quicker movement and more delicate instruments are required to bring out the niceties of cardio-vascular waves and movements, and so to permit of more accurate estimation of synchronism. We ought to think and observe in 0.02 second at most, not 0.20 second, in this work. Such tracings can as a rule only be taken in hospitals, but if they were obtained cardiological inexactitudes would be avoided and many knotty points more quickly unravelled, I have no doubt. I quite agree with what Dr. Thomas Lewis has written about cardiographic record making (p. 86). His diagrammatic representation of the cardio-vascular events is drawn in 0 01 second.

The *jugular pulse* argument, which is used so much now as a basis for deductions in cardio-vascular work, is that a wave synchronous with the *a-s* is present in cases of *a-v* stenosis when a crescendo murmur is heard and marked by hand on the tracing as occurring synchronously with this wave, and that the wave disappears when the crescendo murmur is not heard; therefore the crescendo murmur must be due to *a-s*. This line of argument has been used by Dr. Lewis to prove, in a case in which, at one time, there was a crescendo murmur which disappeared, that since there was an auricular wave in the jugular pulse at the time there was a crescendo murmur, which was still present when there was no crescendo murmur, there must have been contraction of the right auricle to cause the auricular venous wave with synchronous paralysis of the left auricle. I have been unable to find any indisputable proofs of the statement that the crescendo murmur of *a-v* stenosis is synchronous with a wave in the jugular pulse due to *a-s*.

On the other hand, I say that the crescendo murmur is caused by early *v-s*, and then only when the ventricle is contracting well, and that it disappears temporarily when the ventricle muscle acts quietly, and permanently when the muscle fails. A greater or less degree of ventricular disability accompanies auricular muscle failure, and when the latter is marked, and there is no auricular wave in the jugular pulse, the muscle failure of the ventricle is also so considerable that the *i-v* pressure cannot close the mitral valve, and we get in consequence no crescendo murmur, probably only an ordinary regurgitant murmur. So absence of the auricular wave in the jugular pulse will probably be noted in a case in which the ventricle muscle is incapable of producing a crescendo murmur, as is always so towards he end of *a-v* stenosis.

As part of his argument Dr. Lewis stated that some observations of Weiss and Joachim finally settled the question of the actual time of onset of the crescendo

murmur in favour of the *a-s* rhythm. I was much interested in seeing this opinion, and turned to the paper in question, feeling quite sure that if the observation established anything definitely, it would be the early *v-s* rhythm. I now beg to ask those readers of the JOURNAL interested in the matter to look at the paper in *Pflüger's Archiv* and say what they do tend to prove. I give the essential points here.

Weiss and Joachim have devised a most ingenious instrument called the phonoscope, by which they can record in a wonderful and unmistakable way the normal sounds of the heart and any murmurs louder than the very softest blowing type. They publish several tracings, of which two are appended, showing the murmurs of mitral stenosis. The points they make are:

1. The distance from the beginning of ventricular systole to the rise of the carotid pulse in a normal heart is 0.08 to 0.09 second.

2. In mitral regurgitation this is increased to from 0.125 to 0.15 second, according to the degree of muscle failure present. This fact appeared to the writers to be strange, but they explain it by suggesting that blood escapes back through the incompetent valve at the beginning of *v-s*, and delays the development of sufficient *i-v* pressure to open the semilunar valves. This is exactly what I say happens in the development of a crescendo murmur, causing delay of the first sound (see Fig. 2).

3. The crescendo murmur of mitral stenosis occurs well within 0.15 second of the carotid rise (Fig. 4). Time vibration 0.01 second.

4. Weiss and Joachim make a special note of the fact that if the time of commencement of contraction of the auricle before the rise in the carotid artery (0.20 second) be marked off on the tracings, no noticeable sudden alteration of the curve is seen there (Fig. 5). In Fig. 4 they point out that the first vibrations of the murmur are only 0.13-0.14 second removed from the carotid pulse.

Weiss and Joachim do not state what appears to be the obvious conclusion to their work, namely, that the crescendo murmur is *v-s* rhythm, but I have written to them drawing their attention to this, and asking them to examine their records to see if they afford similar support to the early *v s* rhythm theory, an account of which I have sent them.

In my judgement these tracings are not proof positive that the auricle has nothing to do with the production of the crescendo murmur. As there is wanting on them a definite indication of the exact time of onset of *a-s*, it may be argued that the auricle contracts nearer to the carotid pulse in mitral stenosis than 0.20 second; but, on the other hand, one of the chief doctrines of the modern school of cardiology, advanced partly on the assumption of the synchronism of *a-s* and the crescendo murmur, is that the *a-c* interval (between the onset of *a-s* and the carotid pulse) is often increased in mitral stenosis even to 0.40 second.

In conclusion I submit that I have shown that the *a-s* rhythm of the crescendo murmur is not only highly disputable, but even entirely fallacious, and that the murmur is early *v-s* in rhythm. It would be very instructive for all interested in the matter if Dr. Mackenzie will produce his "indisputable" evidence that the murmur is, in part or wholly, caused by *a-s*, so much of the superstructure of modern cardiology being founded on this belief. Then the two discordant views can be compared by readers of the JOURNAL.

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OBSERVATIONS CONCERNING THE BLOOD IN CHOREA AND RHEUMATISM.

BY

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THE association which is generally supposed to exist between rheumatism and chorea is very difficult to understand, and I think we may fairly say that the question of their actual relationship is hardly settled yet. Rheumatism itself is a disease which has a much narrower interpretation to-day than it had some years ago, and a good many cases formerly classed as rheumatic fever are now known to belong to an entirely different category.

In the *Liverpool Royal Southern Hospital Reports* for 1902 I referred to this fact, and directed attention to a series of cases which closely resembled rheumatic fever clinically, but were quite uninfluenced by treatment with the salicylates, and were found to result from toxic absorption from one or another of the mucous tracts. In chorea we have another disease which, although it frequently occurs in children who have suffered from antecedent rheumatic or rheumatoid conditions and is associated with endocardial and pericardial complications, cannot be said to be more than an ally of true rheumatism, and this supposed alliance rests only upon certain clinical similarities and effects which may possibly result from an entirely independent toxin.

It is upon this point that I have been endeavouring to gain some information recently by means of experiments with the bloods of the two diseases. I have also tried to discover whether any evidence can be found to prove or disprove that chorea is to be regarded as an infective disease. The infectivity of chorea is certainly suggested by the remarkable way in which it tends every now and then to become so prevalent as to appear to be epidemic. In November, 1907, there were 5 cases in the wards, all admitted within a few weeks. In 1908, of 18 indoor cases, May and October furnished more than half the admissions; and during May of this year I have had under my care no less than 8 cases, of which 4 presented themselves in one day. It has more than once happened in my experience that two children in the same family have developed the disease in succession, and on one occasion the return home of a convalescent child was followed by the admission of a sister with whom she slept. On making inquiries, I have sometimes found that two or more children in a school have had chorea in succession or simultaneously, and it seems possible that the old impression that children get the disease by imitation may have arisen through the unsuspected infection of one patient from another.

H. C. Ross's method of telling whether leucocytes are living or dead[1] by examining the blood on an agar film containing atropin and a stain, has enabled us to investigate the effects of placing the leucocytes of healthy people in the plasmata of patients suffering from various diseases. He has shown that if the leucocytes of one healthy person are placed in the plasmata of other healthy persons they live a somewhat shorter time than they do in their own plasma, whereas if they are placed in the plasmata of persons suffering from diseases which are due to or associated with certain toxins in the blood, their lives are greatly shortened. This fact has proved useful insomuch that it has (so far as we can tell up to the present) placed in our hands a method of estimating to a considerable extent whether a disease of uncertain nature is accompanied by a toxin in the blood, and it was this general principle which led to my suggesting that we might employ it to throw some light on the problem of the relationship between chorea and rheumatism.

I need not enter into all the details of the experiments, but shall very shortly explain their nature:

1. The first research had for its object the determination of the presence or absence of a toxin in the blood of chorea patients. The chorea blood was mixed in a capillary tube with an equal volume of citrated solution, centrifugalized, and the corpuscles removed. To the remaining plasma a small volume of the blood of a healthy person was added. Simultaneously another tube was prepared by adding the same healthy person's corpuscles to another healthy person's plasma. Both tubes were kept at 30° C. and samples of the contained corpuscles were

examined from time to time on the agar films. The numbers of living and dead corpuscles were counted and averages taken.

2. The same experiment and control were repeated with the blood of persons suffering from acute rheumatism.

3. The effect of placing chorea leucocytes in the plasmata of other patients suffering from chorea was tested against a control.

4. The result of adding rheumatic leucocytes to chorea plasma was observed.

The results of these experiments show (1) that there appears to be in the blood plasma of patients suffering from chorea a poison which is toxic to the leucocytes of healthy persons, and (2) that in the case of rheumatism the plasma does not appear to be so uniformly toxic; in fact, it seemed to be hardly at all poisonous to healthy leucocytes.

Next comes the question, Does any immunity exist between the two diseases? If I place the corpuscles of a chorea patient in the plasma of another chorea patient, they will live nearly as long as the corpuscles of a healthy person's will live in another healthy person's plasma, showing that to some extent the blood cells have become immune to the toxin. This being so, if the toxin in acute rheumatism is similar to that in chorea, the same evidence of immunity should exist when the corpuscles of the rheumatic patient are placed in the plasma of a patient suffering from chorea. When this experiment was carried out, however, it was found that their lives were invariably shortened, and one may infer from this that at all events some difference exists between the poisons in the two conditions.

H. C. Ross has recently made a very instructive experiment showing the value of this method of estimating cellular immunity. I had in the Royal Southern Hospital some time ago a man who had been a morphinomaniac for years, and who habitually took large doses of the drug. His arms presented a mass of cicatrices caused by hypodermic punctures. It was found that his leucocytes lived longer in a citrated solution of morphine than a healthy man's leucocytes did in the same solution under exactly the same conditions, and the lasting properties of this immunity appear to be demonstrated by the fact that the leucocytes of another patient who had been addicted to morphine, but who stated that she had taken none for five months, still appeared to be more or less immune.

We have not been able to tell experimentally whether the immunity in chorea is similarly lasting, but clinically we know how apt the disease is to recur. We hope some time hence to repeat our observations on the bloods of the same patients to test this point. In all probability we shall find that immunity of a lasting character is manifest when the corpuscles of people who have scarlatina—or other infectious diseases which confer immunity—are placed in the plasmata of patients actually suffering from these diseases, whereas the same plasma will prove exceedingly poisonous to the corpuscles of those who are unprotected.

There is just one other point to note with reference to the blood conditions found in chorea and acute rheumatism. In the first two cases of chorea which were investigated there was a marked eosinophilia. The counts showed 20 per cent. of eosinophiles in one and 16 per cent. in the other. I thought this might possibly have been due to some unsuspected intestinal parasites, but examination of the stools for eggs, etc., gave absolutely negative results. Six or eight chorea bloods have been examined since then, and, with one exception, they have all presented this peculiarity.[2] There has been no eosinophilia in any of the numerous cases of acute rheumatism we have examined, and we have here another important distinction between the two diseases. It is noteworthy that this eosinophilia was present in the blood of the child who developed the disease in hospital, and who has been already referred to as occupying a bed next to a chorea patient.

The observations which I have made in my opinion tend to confirm the suspicion that there is less real association between chorea and rheumatism than is generally thought to be the case, and that chorea may be due to an infective toxaemia of distinctive character.

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A CASE OF ENTEROSPASM SIMULATING ACUTE OBSTRUCTION.

BY

F. E. WYNNE, M.B., LEIGH, LANCS. and F. P. STURM, CH.B., LEIGH, LANCS.

CASES in which the existence of enterospasm has been demonstrated during operation are still sufficiently rare to justify the publication of the following:

Mrs. G., aged 45, was seen by us in consultation on June 19th last, and was found to be suffering from symptoms which pointed to acute obstruction.

History.

Several similar attacks in the past had been diagnosed as biliary colic. Three years previously acute obstruction had apparently supervened, but while arrangements were being made for immediate operation the bowels acted naturally and all symptoms subsided.

State on Examination.

When we saw her there had been no motion for four days, there was incessant vomiting, and intense pain which could be localized neither by the patient nor by palpation. The abdomen was distended and tympanitic, with some dullness in the right iliac region. Abdominal respiration was present but impaired. The temperature was normal, the pulse 150, the facies typically abdominal. The diagnosis appeared to lie between obstruction from an impacted gall stone and appendicitis. The patient was in an extremely critical condition. Operation was offered and accepted.

Operation.

The abdomen was opened in the middle line between the umbilicus and pubes. Coils of distended small intestine immediately crowded into the wound. These being protected by hot sterile cloths, a hand was introduced and a careful examination made of the abdominal cavity. The gall bladder was empty, the hernial orifices free, and the large intestine normal from the hepatic flexure to the rectum. The caecum was obscured by adhesions. Upon withdrawing the examining hand a coil of collapsed and almost bloodless small intestine followed into the wound. The distended jejunum was traced downwards in search of a constricting band or other cause of obstruction. About 2 ft. beyond the ligament of Treitze the jejunum merged suddenly into the coil of collapsed gut. There was no band nor any other constricting cause. The gut below the constricted coil was normal. The constriction was moving slowly but distinctly upwards—a fact that was confirmed by each of us and also by Mr. Pickup who was administering the anaesthetic. One of the distended coils was opened and evacuated. It was then found possible to return the intestines and examine the appendicular region.

An enlarged and congested appendix containing a concretion which proved ultimately to be a gall stone, was with difficulty dug out of the usual nest of adhesions deep in the pelvis. The accompanying photograph shows the appendix slit open, with the gall stone in a pouch of the swollen mucous membrane.

Death.

The wound was closed and the patient put back to bed. She never rallied from the shock of the operation, in spite of intravenous transfusion of saline, but died at 8 o'clock the same evening.

The following points of interest emerge:

1. The association of old appendicular trouble with enterospasm suggests a reflex origin of this curious condition, and a possible explanation of certain cases of faecal vomiting, as the peristaltic action was reversed.

2. The history of repeated attacks of biliary colic is curious since only one gall stone was found, and that in the appendix. Many other gall stones must have succeeded in passing the trap.

3. A similar, though much less severe, attack three years previously had been relieved by a natural action of the bowels.

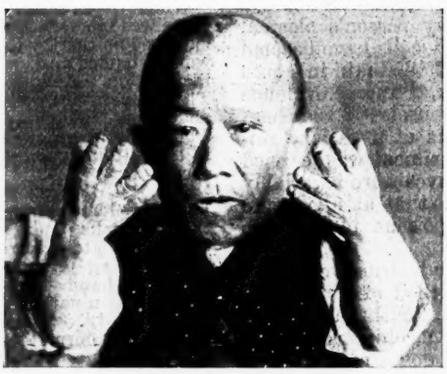
4. The case was a perfect clinical picture of acute abdominal mischief, but without the abdominal rigidity usually associated with such conditions.

5. The unexpected collapse and death suggests that even a moderate amount of abdominal manipulation in these spastic conditions of the bowel involves an inordinate degree of shock, a conclusion that is confirmed by the results of the majority of the other few cases of enterospasm that we have seen recorded.

ACHONDROPLASIA OCCURRING IN A CHINAMAN.

BY GORDON MOIR, SURGEON, R.N.

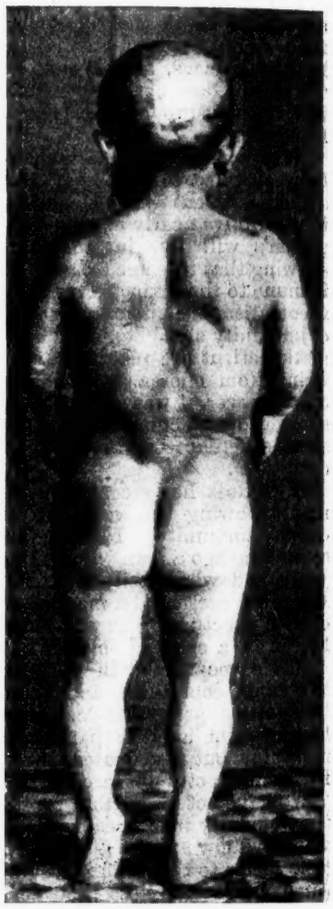
THE following notes, and the photographs by which they are illustrated, were obtained with some difficulty in Shanghai, where the man resides. The family history was very meagre, but he stated that his father and mother (natives of Hankow, 500 miles up the Yang-tse-Kiang) were of normal size; both of them are now dead. He is married, and has a son and a daughter, but neither could be observed.



The man himself is 58 years of age, quite intelligent, bright and alert. He earns his living (chiefly on account of his small size) by dancing, buffoonery, etc. He talks English to a slight extent.

The physical conditions are entirely due to achondroplasia, there being no signs of rickets. The head is large and globular, the occipital bones being well developed. The bridge of the nose is depressed, the lips and eyelids are not thickened; the teeth are nearly all gone; the vault of the palate is normal in appearance. The lower limbs are short, but remarkably well-developed muscularly. He is somewhat flat-footed; the legs are well formed; there is bowing, and no nodosity present.

The umbilicus is altered from the normal position of $\frac{1}{1}$ to $\frac{42.75''}{19''}$ or $\frac{2.35}{1}$. Hair, especially pubic, is very scanty, but this is common among the Chinese. The ribs are normal, no beading being present. The arms are very short; when they are hanging down the side, fully extended, they only reach the crest of the ilium, instead of halfway down the thigh, as in the normal individual. The radius has no enlargement on its lower end; the shortness of the radius ($2\frac{3}{4}$ in.) gives a great increase to the normal radial curve.



The following measurements were obtained:

1. Height, $42\frac{3}{4}$ in.
2. Umbilicus from ground, 19 in.
3. Circumference of head, $22\frac{1}{2}$ in.
4. Clavicle, $2\frac{3}{4}$ in.
5. Tip of mastoid to tip of mastoid, 7 in.
6. Radius, $2\frac{3}{4}$ in.
7. Olecranon to ulnar spine, 5 in.
8. Anterior superior spine of ilium to internal condyle, $9\frac{1}{2}$ in.
9. Internal condyle to internal malleolus, 8 in.
10. Chest expanded, 27 in.

A CASE OF "DERCUM'S DISEASE."

BY G. McMULLAN, M.B.,
WALLINGFORD, BERKS.

THE following case appears to me to be of sufficient interest, if only as a clinical curiosity, to warrant its publication, presenting, as it does, almost all the characteristic symptoms of adiposis dolorosa, as described by Dr. Dercum in 1892 at the Neurological Society of New York.

History.

Elizabeth N., aged 61, married, with ten children (height, 5 ft. $6\frac{1}{2}$ in.; weight, about 12 st.), enjoyed good health until five years ago, when she commenced to suffer from numbness of the hands and arms, followed later by pain of an aching character, and subsequently by symmetrical fatty deposits in both upper arms. The condition led her to consult a medical man, who told her they were fatty tumours, and not to worry, and this I have since confirmed, being informed by another practitioner that he had seen the case four years ago, and at that time one arm, at least, presented a circumscribed fatty tumour on its upper and outer aspect.

These deposits in course of time attained considerable dimensions, the pain and numbness being also increased to such an extent that she was unable to undertake even the lightest household duties, and was obliged once more to seek medical advice.

With the aggravation of the symptoms referred to the arms, pain and numbness were experienced across the back and chest, and lately in the thighs just above the knees. There is nothing noteworthy in the family history.

Previous Illnesses.

Two years before I saw her the patient had severe haematemesis on several occasions and nine months ago uncontrollable haemorrhage following upon the extraction of a tooth; save for these haemorrhages and the present condition with which they are probably associated, patient has always enjoyed good health. Her habits are satisfactory at present. She has probably consumed more than an average amount of alcohol in the past.

Present Condition.

She is pale and sallow, and evidently suffers from debility and some anaemia. The conjunctivae and mucous membrane of the mouth and gums is paler than normal, and the latter seem spongy. The skin is dry and harsh, perspiration being very deficient. The temperature is 98° F., and the pulse 76. On inspection the observer is struck by the large diffuse deposits of fat, pendulous and flabby in consistence, which involve both upper arms, and to a lesser extent the upper portions of the forearms on both their extensor and flexor aspects.

Measurements.

Upper right arm, 29 in. at thickest portion.
Upper left arm, $22\frac{3}{4}$ in. "
Right forearm, $11\frac{1}{2}$ in. "
Left forearm, 11 in. "

Furthermore, there is a pad of fat over the manubrium sterni extending for a few inches across the second and third costal cartilages at either side. The back also shows symmetrical fatty deposits over either scapular region and extending as low as the tenth or eleventh rib.

Below the waist the patient shows no pathological increase of fatty tissue, her legs being more slender than one would expect in such a large woman. The hands and feet are normal. There are no fatty deposits about the neck.

The patient complains of numbness and tingling, with aching pains at times, principally in the upper limbs, but also across the chest and between the shoulder blades behind. To a lesser extent these symptoms occur in the thighs, just above the knees to the inner side. The pain is very much aggravated by using the limbs.

The arms are tender wherever the fatty tissue is present, and even slight injuries cause bruising and discoloration. There are marked hyperaesthetic areas over both arms, principally on the outer and posterior aspect of the limb, but no areas of anaesthesia can be demonstrated.

The patient is fairly bright and intelligent, but complains of some loss of memory. There is, however, nothing about the case to suggest myxoedema.

The following characteristics of adiposis dolorosa are, however, present: The history of numbness and pain, followed by diffuse symmetrical fatty deposits; the associated haemorrhages; the presence of hyperaesthetic areas; and the general debility and harsh, dry skin of the patient.

With regard to treatment: I have followed the recommendations of Dercum and others, and have been giving the patient thyroidin, grains v, t.i.d., and thus far, a period of scarcely two weeks, the result has been very satisfactory. The pains have almost disappeared, the numbness and tingling have been very much alleviated, and there is a distinct reduction in the size of the right arm of almost ½ in. She herself states that she feels very much better, and can sleep and do a little work much better than she could for several months previously.

THE latest addition to the many societies in Paris connected with medicine has given notice of its intention to organize next November an exhibition of painting, sculpture, and engraving. This society, l'Esculape by name, is devoted to a combination of art and medicine, and to meet its purposes it proposes to hold literary, dramatic, and musical conferences. Among its council are Richelot, Widal, Gilbert, Gariel, and Labbé, all professors in the medical faculty of the University of Paris. The president is M. Bezançon, another officer of the society being Dr. Cabanés, editor of *La Chronique Médicale*.

INHALATIONS of oxygen have been used with good results in thirty severe cases of whooping-cough by Weill and Mouriquand (*Lyons Médical*, cxiii, p. 309). The severity but not the number of the kinks was diminished, yet the relief was so great that some of the children learnt to ask for the inhalation when they felt that a kink was coming on. The authors believe also that the risk of bronchopneumonia is lessened and its severity diminished if the oxygen is given every hour so soon as symptoms of the complication are suspected. Otherwise the gas is given at or, if possible, just before the beginning of the kink, as much as 10 or 20 litres being administered on each occasion through a funnel.

SEVENTY-SEVENTH ANNUAL MEETING

OF THE

British Medical Association.

Held at Belfast on July 23rd, 24th, 26th, 27th, 28th, 29th, and 30th.

PROCEEDINGS OF SECTIONS.

SECTION OF HYGIENE AND PUBLIC HEALTH.

LOUIS COLTMAN PARKES, M.D.Lond., President.

DISCUSSION ON LATENT INFECTIONS BY THE DIPHTHERIA BACILLUS.

OPENING PAPERS.

I.—PATRICK WATSON WILLIAMS, M.D.Lond.,

Lecturer on Diseases of the Nose and Throat, University of Bristol; Laryngologist, Bristol Royal Infirmary.

THE CLINICAL SIDE OF THE QUESTION.

SINCE my share in the introduction of this discussion is limited to consideration of the question from the clinical standpoint, I propose merely to direct attention to various clinical phases of latent diphtheritic infections, giving concrete examples when required.

If diphtheria may be defined as any pathological condition, local or general, due to infection by specific diphtheria organisms, then diphtheria is "latent" when such pathological conditions are unaccompanied by obvious illness or by symptoms sufficiently characteristic to be recognizable as those of diphtheria. With regard to the classification of such cases I cannot do better than retain that which I made in introducing a similar discussion at Leicester at the annual meeting in 1905, more especially as my grouping has been accepted in the main by Nuttall and Graham Smith in their recent monograph.

From the clinical standpoint cases of latent diphtheria may be grouped under three heads:

A.—Patients who afford none of the usual clinical indications of diphtheria, are not definitely ill, and yet are found to be anaemic, or have increased pulse frequency, or are simply poorly in association with nasal catarrh, membranous rhinitis, faucial redness or slight subacute tonsillitis, otorrhoea, sores, etc., which on bacteriological examination prove to be diphtheritic.

Of such cases I present two examples:

CASE I.

G. B., aged 2 days, prematurely born (about seven and a half months' gestation), was admitted with her mother to the Bristol Royal Infirmary October 11th, 1908, weight 4½ lb., yellow and wizened.

About December 24th it was noticed she had some nasal discharge, and as it did not clear up I saw her on January of this year and took it to be simple rhinitis. On February 6th cultures were made from the nasal discharge, that is, after it had persisted for six weeks, more as a matter of interest than because it was thought to suggest diphtheria, which, however, it proved to be.

The child died very shortly after. It was a good example of latent diphtheria, for no symptom pointed to the true nature of the case. There was no evidence of any sore throat, and, as the child was only 4 months old, I confess my inspection of the nasal passages was not satisfactory. A case of primary nasal diphtheria is reported by Kuhn[1] in a baby aged 2 weeks, probably contracted from the maternal genitals in parturition.

CASE II.

Mrs. V. O., a lady whom I had been attending a long time for asthma and accessory sinus suppuration, mentioned on March 29th, 1909, that her throat was uncomfortable. On the left tonsil was a small pocket with some exudation from one or two crypts, and the area of tonsil around was a little reddened. She

[1] *Journal of Laryngology*, February, 1909.

said she had several times had the same before as a child and since. I took a swab, which Professor Walker Hall examined by culture and reported on the 31st as yielding an almost pure growth of organisms presenting the chief morphological characters of Klebs-Loeffler bacilli, but showing a number of atypical forms. As the patient had no symptoms I had contented myself with local antiseptic applications, but on seeing the slide with many typical beaded bacilli of medium length, I gave 10,000 units of antitoxin.

Meanwhile, a girl aged 12, who had come to stay with her, and who had a slight nasal catarrh, was examined, and although I could find nothing abnormal except a little increased redness and fullness of the nasal mucosa, like slight hypertrophic rhinitis, and she was very well indeed, I had cultures made from the nose and throat, and Dr. Russell, the city bacteriologist, found typical diphtheria organisms (Westbrook C_3) in the nose. This child had had regular diphtheria a few years before. As she seemed to have a cold on arrival, two or three days before Mrs. V. O.'s sore throat, Mrs. V. O. had refused to kiss her; but the child declared she would give her a hundred kisses, and was lavish in her embraces. On April 1st, the day after the antitoxin injection, Mrs. V. O.'s throat appeared practically normal, except a little localized redness of the tonsil; but several times cultures were taken subsequently. On two occasions Dr. Russell found typical Klebs-Loeffler bacilli (A_1, C, C_1, D, D_1, D_2). Her health was affected to the extent of being worried and sleepless, and her heart's action weakly with a pulse of 110 when up, but this was in part accounted for by her chronic nasal trouble.

Shortly after this she motored off to her country house, and was under the care of her own medical attendant there. Cultures from throat swabbings, taken April 27th, submitted to the Laboratory of Pathology, New Cavendish Street, London, were reported by Dr. Eastes as follows:

"Swab from left tonsil, fairly numerous Klebs-Loeffler bacilli. Swab from right tonsil, culture contaminated with large bacillus of *subtilis* type which obscures all other growths."

Meanwhile, however, former cultures were being tested for virulence by Professor Hewlett, and one culture (made April 4th) was reported to be practically non-virulent, and a second culture, which gave ordinary barred and beaded diphtheritic organisms, was purified by subculturing, and Professor Hewlett reported that the result of inoculation was that 0·5 c.cm. of a forty-eight-hour broth culture killed a 300 gram guinea-pig within forty-eight hours, so that the organism was at least of fair average virulence.

By this time the patient had motored back again and for the greater part of the time had been getting about. She was free from organisms in throat or nose (two separate cultures) by May 27th. The little girl, who was always in excellent health and spirits, soon lost all organisms from the nose, after the use of antiseptic sprayings; whether they will reappear I cannot say.

B.—Cases with local diphtheria lesions, but presenting no general symptoms of ill health.

This class comprises cases that are indisputably "latent," and I propose to cite two examples in point.

I will briefly refer to a Bristol example (reported at greater length in the report of the medical officer of health, Bristol, 1903, "Diseases of the Mouth and Nose," p. 139).

A lady had an indefinite sore throat, and three weeks later gave a children's party. Two children who were kissed by her developed membranous rhinitis, one eleven days and the other sixteen days after the party, and although apparently in perfect health, Dowson and Klein found virulent diphtheria bacilli in cultures from their noses. After two months' treatment they were declared free, but after another two months their own mother, after kissing them, developed diphtheria, and the children were then again found to have nasal diphtheria.

I may recall, too, the case of pharyngo-keratosis of five months' duration, following an attack of follicular tonsillitis, in a schoolmaster, recorded by H. J. Davis.[2] The condition was typical of pharyngo-keratosis in a man in excellent health, though pale. The secretion was swarming with Klebs-Loeffler bacilli. For some months there had been outbreaks of tonsillitis amongst the children of the school; some of these were proved to be diphtheria, but with the isolation of the master the outbreaks of sore throat ceased.

Other examples have occurred of virulent diphtheria organisms found in otorrhoea, conjunctivitis, stomatitis, cancrum oris, external rhinitis (Todd), and in sores on the lips, cheek, finger, vulva, vagina, and rectum. Some years ago a boarder at Clifton College had a diptheritic sore round the orifice of the rectum, which I considered arose from infection from other cases developing in the house. He went home, and a culture by his medical attendant proved negative; nevertheless, his sister developed diphtheria.

Cases of purely local diphtheria are of considerable importance, as the few examples I have cited sufficiently prove.

C.—The third class comprises persons who present no local lesions and no departure from normal health, but in whom diphtheria organisms have been discovered by culture tests, for example, healthy infected contacts.

Speaking at Leicester, I stated that it had yet to be shown that such infected contacts were liable to spread diphtheria, or were actively infectious, till they developed local symptoms, and on this statement Graham Smith offers a fair criticism when he points out that diphtheria is usually most prevalent at seasons of the year when "colds" are common. Consequently, a member of this group may at any time by developing a "cold" be converted into a member of Group 2; but I do not agree with him when he goes on to state that:

Even if Watson Williams's opinion is correct, it is therefore almost as necessary to guard against the possibility of the spread of the disease by members of Group 3 as of Group 2, and for the simple reason that it is impossible to carry out such precautions in practice.

A few of the examples collected by Graham Smith appear *a priori* sufficiently reliable to upset my position; but no contact has been properly examined unless the nasal passages have been explored, and no cultural test for the presence of diphtheria is complete or safe which does not include the nose as well as the throat; and in none of the instances cited by Graham Smith is it stated that the nose was ever investigated.

Cultures from the nasal passages of house-surgeons and nurses who have been in attendance on diphtheritic patients, especially when no precaution is taken to avoid contact of the swab with the vibrissae of the vestibule, will often show the presence of virulent diphtheria organisms, without any local symptoms or signs. I do not pretend that they cannot, under such conditions, possibly convey diphtheria, for it is proved that diphtheria organisms on clothes, or on a cat's fur, may infect; but, Mr. President, I may be permitted to refer to your own and Dr. Hewlett's researches, which long ago proved that organisms inhaled and merely coming into contact with the nasal mucosa were quickly removed by natural means in healthy subjects. When the organisms are retained and multiply, we have no longer a contact, but a local infection, and if no general symptoms arise, the case becomes one of "latent diphtheria" in my Group 2.

DIAGNOSIS.

For the diagnosis of latent diphtheria we have to depend on bacteriology, and notwithstanding "the discovery by Davis, Anna Williams, Ruediger, and Hamilton and Horton of diphtheria-like bacilli which were virulent and yet not neutralized in their pathogenicity by the true diphtheria antitoxin,"[3] I suggest that the most practical criterion at our disposal, which stamps a case as clinically true diphtheria, is a virulence test, morphological tests being unreliable. In support of this statement I relate the following very interesting case:

C. G., a boy aged 13, a boarder in a house of forty-four boys at Clifton College, on November 23rd, 1905, had a slight sore throat, but was otherwise, then and subsequently, in excellent health. There was no other case of diphtheria in the school. The tonsils were slightly enlarged and abnormally red, but there was no false membrane.

Cultures from the throat yielded a few Klebs-Loeffler bacilli; nose negative. He was sent home under my care. The history of the case was as follows:

November 23rd, 1905, throat, few D_1, D_2; nose negative (Kent).
November 28th, throat, few D_1, D_2 (Kent).
December 8th, throat, free growth, C, D; C_1, D_1; D_2 (Kent).
Virulence test (two weeks from onset), report non-virulent (Kent).
December 30th, 1905, throat, numerous Klebs-Loeffler bacilli (Clinical Research).

Opinion sent in a letter, dated January 1st, 1906, from the Clinical Research Association: "You will see from its inspection that the organism present is identical in its morphology with the long variety of Klebs-Loeffler bacilli. We are surprised to hear that inoculation experiments have shown it to be non-virulent, because this type of organism is generally markedly virulent. We are preparing a pure culture of the

[2] *Proc. Roy. Soc. Med.*, 1909, vol. ii, No. 7, p. 127.

[3] A study of the diphtheria groups of organisms, Ldusser. Studies from the Department of Pathology of the College of Physicians and Surgeons. Columbia University, XI, 1906-1908.

organisms." This pure culture was sent without comment to Professor Delépine, who tested it for virulence, and reported on January 22nd: "The culture has been tested by inoculation. There is no evidence that it is now virulent."

Needless to say, it was not from any lack of confidence in the then Bristol City Bacteriologist that I had separate cultures sent to the Clinical Research Association; but it was of paramount importance to have a very strong support in my contention that these virulent-looking organisms were harmless, and it adds greatly to the value of the case that two independent authorities prepared and reported on the cultures, and that two independent tests for virulence proved negative. On my recommendation the boy was received back in school as a boarder, with organisms still in his throat, and without any bad consequences. The only treatment employed was local antisepsis, but that had no appreciable effect.

For further evidence that non-virulent diphtheria bacilli when transferred from one person to another do not become virulent or give rise to disease, I will refer to examples reported by Graham Smith, Cobbett, and Park and Beebe,[4] and I have myself reported an instance in my practice of a boy who had nasal diphtheria in December, became free, returning to school in February, had further negative cultures taken, yet four months after his first attack the nose yielded a positive culture. But no cases of diphtheria arose amongst his fellow-boarders from his return to school and mixing freely with them before the last positive culture was taken. No virulence test was made, because the boy had pleurisy and passed out of my hands.

TREATMENT.

Latent diphtheria being essentially a local diphtheritic infection, one might naturally expect that the application of antiseptics would afford satisfactory results in causing the disappearance of the bacilli, yet unfortunately clinical experience leads to the conclusion that, although the infectivity of the patient is diminished while superficial organisms are killed or rendered less virulent while antiseptics are used, the period of infectivity is not shortened, for the organisms will reappear after the antiseptics are left off just as long as they would appear if no antiseptics had been used. The fact is we cannot get the antiseptic to the organisms which have invaded the superficial layers of the mucosa; and we cannot even apply antiseptics to the deepest pockets of the lymphoid crypts, or to the lining surface of the accessory sinuses when the nasal passages are involved. In clinical cases the removal of tonsils may be a helpful method, advocated by Pegler[5] in 1905, and the same may be said of irrigation of the maxillary antra.

Antitoxic serum probably has some antimicrobial effect, and attempts have been made (L. Martin) to prepare an antimicrobial diphtheria serum, and to use it dried, in the form of pastilles, for its local action to decrease the number of living bacilli in the throat. Dr. Davis's case of pharyngo-keratosis received five injections without amelioration, but he has recently written to tell me that after four more large injections absence of diphtheria bacilli to culture tests was shown after several cultures. But I think that in a large percentage of cases antitoxin serum injections fail, possibly because the proportion of bactericidal substance varies, and because it is necessary to use larger quantities of the serum than is necessary for antitoxic effects.

Vaccines may be employed. As long ago as 1897 Van de Velde[6] used injections of dead bacilli to produce antimicrobic properties in the blood of goats, and L. Martin,[7] by injecting bacillary bodies into a horse, prepared serum which, he stated, when applied locally, caused a rapid decrease in the number of bacilli in the mouth. More recently Petruschky,[8] of Dantzig, has used injections of cultures mixed with physiological salt solution (1 to 100) in six cases of chronic latent diphtheria, in every case with favourable result. The injections were from 0.1 c.cm. to 0.5 c.cm. of the diluted culture, and varied from one to several injections in the different cases.

In one case that was referred to me my colleague, Professor Walker Hall, has been employing vaccines that he prepared himself.

I will refer to one other method that is worthy of consideration—namely, cataphoresis. In a case of local chronic diphtheria of the ear resembling in clinical appearance eczema of the external meatus Dr. Tayler, of Trowbridge, has been employing cupric ionization.

Miss D. N., aged 30, was referred to me by Dr. Pearse of Trowbridge on January 27th, 1909, complaining of discharge from the left ear of five months' duration, with acute onset of earache, followed by thin purulent discharge. Dr. Pearse had found Klebs-Loeffler bacilli. The left external meatus was almost filled with scaly discharge, and the skin of the concha for half an inch round the meatal orifice was covered with scaly crusts. I found she had well-pronounced chronic atrophic rhinitis, with crusts of inspissated secretion, in both nasal passages. She was very dull and apathetic, with slow cerebration, and her hands were cold and doughy, and the skin slightly cyanotic. Dr. Pearse had got the ear to clear up, but it always broke down again.

Professor Walker Hall identified Klebs-Loeffler bacilli in cultures from the meatal discharge.

Dr. Tayler saw her on April 18th, 1909, when almost the whole of the left pinna was covered with a thick crust, which oozed pus on pressure. Cultures from the pus showed varied flora. Klebs-Loeffler bacilli were present.

April 19th,	ionized with copper,	10 m.a.	for ten	minutes.	
April 27th,	,,	,,	,,	,,	,,
May 8th,	,,	,,	,,	,,	,,
June 8th,	,,	,,	8 m.a.	,,	,,

Each time the patient came up for ionization the case showed distinct improvement, and on the last occasion the greater part of the ulcer had healed, and the patient's general condition had become much more satisfactory.

II.—R. M. BUCHANAN, M.B., C.M.Glas.,
City Bacteriologist, Glasgow.

THE BACTERIOLOGICAL ASPECTS.

AFTER some introductory remarks, Dr. Buchanan said Latent infection may be regarded from the bacteriological standpoint as the presence of an infective agent unaccompanied by any obvious pathological change. It may even be said that in every part of the body there is latent infection—in other words, infective agents which are only held in check by what we call vital resistance on the part of the tissues, or diminished virulence on the part of the specific microbe. In this sense, when an individual harbours a well-defined pathogenic germ without betraying its presence by any symptoms, such an individual has come to be regarded as a carrier of infection, and in that respect a potential danger to his fellows.

The experience of recent years has given some bounds to the distribution of the diphtheria bacillus. It has been ascertained that the cases admitted to hospital as diphtheria include a very large number of individuals with no bacteriological evidence of diphtheria. The results of the bacteriological examinations of 30,000 certified cases quoted by Graham Smith showed that the bacillus was present in only 71 per cent. My own experience of systematic examination of a series of hospital cases, numbering 128, showed that the bacteriological evidence of diphtheria was present in only 76 per cent. Again, the specimens presented for diagnosis in the routine work of a bacteriological laboratory afford a relatively small proportion of positive results. Since this work was inaugurated in the Public Health Laboratory of Glasgow nine and a half years ago, 9,935 specimens have been submitted, and only in 31 per cent. was a positive result obtained. The clinical evidence, therefore, of the distribution of the diphtheria bacillus must be very indefinite, and renders the diagnosis of the disease, apart from bacteriological methods, difficult and uncertain. If these facts have unsettled the clinical conception of the disease, the distribution of the bacillus in healthy persons has in like manner revolutionized our ideas of its epidemiology.

CHARACTERISTICS OF THE BACILLUS IN LATENT INFECTION.

Type.—The identification of the diphtheria bacillus in routine diagnostic work may be said to depend on the morphological characters of the organism. The exigencies of the work demand expedition, and while this may be at the expense of accuracy in a small proportion of cases, it is to be borne in mind that it is the only method as yet

[4] The Bacteriology of Diphtheria, Nuttall and Graham Smith *Journ. of Laryng. and Rhin.*, November, 1905.
[5] BRITISH MEDICAL JOURNAL, 1905, vol. ii, p. 651.
[6] Beiträge zur Kentniss der antitoxischen und anti-infectiosen Kraft des Antidiphtherieserums, *Cent. f. Bakt.*, xxii, 527. Cited by Nuttal and Graham Smith.
[7] Loc. cit.
[8] *Arbeiten a. d. Geb. der patholog. Anatomie*, Bd. 6, Heft 2, 1908.

available to meet the requirements of prompt administrative action. At the same time it is quite understood that morphology in itself is not sufficient to place the recognition of the bacillus beyond doubt, and that it is necessary for this purpose to resort to cultural and inoculation tests involving four to six days as a minimum period of time.

The great variety of forms presented by the diphtheria bacillus in cultures from the throat has led to repeated attempts to arrange these forms in definite classes or types. The result has been that each observer has evolved a classification of his own—an indication that the problem is a difficult one, and that the interpretation of morphological characteristics is a matter into which the personal equation of the trained observer largely enters. Nevertheless, morphological classifications of an organism possessing such a wide range of polymorphism are essential, even though they are to some extent arbitrary, serving the useful purpose of facilitating description. The strains of bacilli from different individuals, whether cases or contacts, may show differences of form, as observed in cultures on ordinary ox serum, which differences they tend to maintain throughout residence in the throat. Thus the form may be (*a*) uniformly cylindrical with deeply staining round or oval terminal granules, and the rod may be of different length in different cases, or (*b*) very irregular in size and staining, and may be slightly curved. In addition to this persistence of one or other of these forms in individuals there has been found something like a seasonal prevalence, inasmuch as the cylindrical form, while it may prevail throughout the year, appears to predominate in winter, and the irregular form in summer. On this point, however, further observation is necessary.

While recognizing these as the two chief types in which the bacillus is met with in cultures, other forms are frequently seen which appear as modifications of the bacillus induced by environment. Thus, there are spindle forms, described by Eyre as the "sheath bacillus," tapering to a point at either extremity, and having in its centre a mass of deeply-stained protoplasm; forms in which the protoplasm is beaded or barred; and elongated clubbed forms with one or both ends swollen, and suggesting arrested cell division. There is evidence to show that multiplicity of form is largely due to the influence of the artificial nutrient medium. How much morphology is influenced by the human body, by season, and by locality has still to be determined. Some types at least can be produced at will in artificial cultures by using different media. For example, a given strain of the bacillus on ox serum with saccharose produced in eighteen hours cylindrical forms; ox serum with glucose, cylindrical and cuneate mixed; a mixture of serum-water (Hiss) and nutrient agar (equal parts) produced all spindle forms; serum-water with 1 per cent. agar produced very short forms resembling Hofmann's bacillus; and ordinary nutrient agar produced a mixture of spindle, cuneate and acuminate forms.

With the view of giving support to bacteriological diagnosis based on morphology, various culture tests have been devised, but hitherto they have been attended with the disadvantages of delay. The use of media containing different sugars, with an indicator to show the presence or absence of acid production, has given the best results. I find that a fluid medium which is a modification of Hiss's serum-water gives excellent and rapid results. It is made by coagulating ox serum in an equal quantity of water, filtering, adding to one half 1 per cent. glucose, and to the other half 1 per cent. saccharose, and tubing—using neutral red as an indicator. In twenty-four hours a marked acid reaction is produced in the glucose tube by *Bacillus diphtheriae*, in both the glucose and saccharose tubes by *Bacillus xerosis*, while no change is produced in either tube by the bacillus of Hofmann.

Virulence.—The virulence of the diphtheria bacillus in apparently healthy subjects, whether designated contacts or carriers, is only slightly less than the virulence of the organism in patients. Since the beginning of 1907 the virulence of the bacillus from 21 contacts has been tested by the inoculation of guinea-pigs, with positive results in 14, or 66 per cent. The test as applied to the bacillus isolated from 56 patients in the same period showed virulence in 74 per cent. It is important to remember that the *Bacillus diphtheriae* is most tenacious of its virulence. Attempts have been made by a number of observers to reduce the virulence of the organism by the usual means of heating, drying, and prolonged cultivation, without any conspicuous success. On the other hand, it is possible to increase the virulence of a particular strain experimentally. We have, then, to deal with a microbe that does not readily lose the quality of virulence and that shows the capacity of recovering it to some extent in the event of attenuation.

Virulence of Bacillus Diphtheriae isolated from Contacts and Clinical Cases.

	Contacts.		Patients.	
Year.	Examined.	Virulent.	Examined.	Virulent.
1906	—	—	2	2
1907	6	2	23	15
1908	9	7	24	19
1909 (six months)	6	5	9	7
	21	14*	58	43†

* = 66 per cent. † = 74 per cent.

Persistence.—When the bacillus gains a lodgement in the throat it appears to remain for a varying length of time, whether it produces disease or not. The period of residence of the organism in the sick and the healthy is probably determined by the same factor; at any rate the presence of the morbid process, while producing antagonism to the toxin, has apparently no effect on the vitality or virulence of the bacillus itself. This is further exemplified in the futility of antitoxin administration as a means of getting rid of the bacillus. It is further to be remembered that the duration of persistence is not influenced by age, sex, or season.

This persistence of the organism in convalescents has been the subject of much investigation, and all observers are agreed that they disappear in the majority of cases well within the usual six weeks of isolation. Beyond this time there is a varying residuum of cases, difficult to estimate in amount, but ranging from 1 to 10 per cent., which retain the bacillus for longer periods. A comparison of clinical cases and contacts reveals the fact that there is no marked difference between them in the average period during which the bacillus is harboured in the throat. Taking 33 clinical cases followed out till the disappearance of the bacillus (in most cases two or more consecutive negative results being obtained), it was found that the average period was twenty-two days. On the other hand, 27 contacts similarly gave an average period of eighteen days. These observations are much too limited to found upon, and only serve to draw attention to the fact that the residence of the bacillus in the throat is much the same, whether attended by clinical symptoms or not.

Duration of the Persistence of the Bacillus.

Period of Persistence of Bacilli in Weeks.	Clinical Cases.	Contacts.
1	1	4
2	15	8
3	2	6
4	3	4
5	7	2
6	2	3
7	1	—
8	—	—
9	2	—
	33	27
Average period	22 days	18 days
Over 6 weeks	9 %	—

The observations of Cobbett and Graham Smith[1] strongly emphasize that fact. In a table constructed by the latter the mean period for notified cases was 31.6 days for virulent bacilli and 18.5 days for non-virulent bacilli, and for infected healthy contacts 36.4 days for virulent bacilli and 30 days for non-virulent bacilli.

FREQUENCY OF INFECTION IN CONTACTS AND SCHOOL CHILDREN.

Contacts.—The systematic examination for evidence of *Bacillus diphtheriae* in persons who have been in more or less intimate contact with cases of diphtheria has now become a recognized preventive measure in public health administration. It has been in operation in Glasgow for over three years. The number of examinations during that time has been 2,305, with a positive result in 211, or a little over 9 per cent.

Diphtheria Contacts.

Year.	Diphtheria Contacts Examined.	Number Found Positive.	Percentage Positive.	Test of Virulence.		
				Number Tested.	Positive.	Negative.
1906 (10 months)	322	34	10.5	0	—	—
1907	692	48	6.9	6	2	4
1908	841	78	9.2	9	7	2
1909 (6 months)	450	51	11.3	6	5	1
	2,305	211	9.2	21	14	7

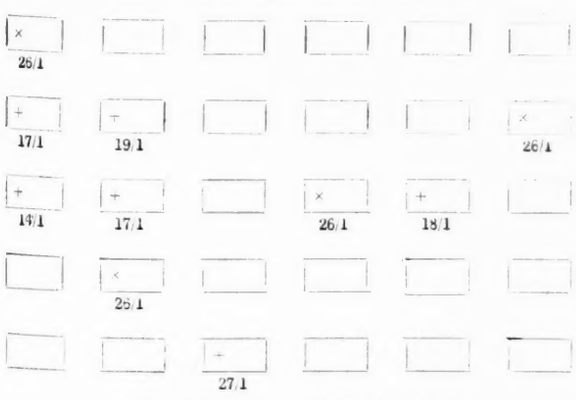
School Children.—There have been few opportunities of examining outbreaks of diphtheria in schools and institutions. In the few instances that have occurred bacteriological examination of the contacts revealed those who harboured the diphtheria bacillus in close association with the clinical cases. I am indebted to Dr. Chalmers and to his assistant, Dr. William Wright, for the information contained in the following presentations of the spread of infection in two public schools, in which the localization of the infected scholars and contacts can be seen at a glance.

In H. school there were 45 pupils, seated 2 at a desk, producing 6 clinical cases and 4 infected contacts. Here we have an illustration not only of the narrow range of the infection, but of the success of the bacteriological method in tracing down infection to its source. In T. S. school the same close association is apparent between clinical cases and infected contacts.

H. PUBLIC SCHOOL (INFANT DEPARTMENT)

Situation of Clinical Cases (6) and Infected Contacts (4) in Room No. 11 (two Scholars at each Desk).

45 scholars: 45 examinations (by swab): 4 +.



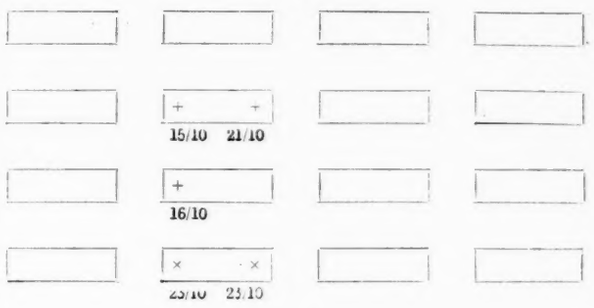
+ Clinical case. × Infected contact.

T. S. PUBLIC SCHOOL (INFANT DEPARTMENT).

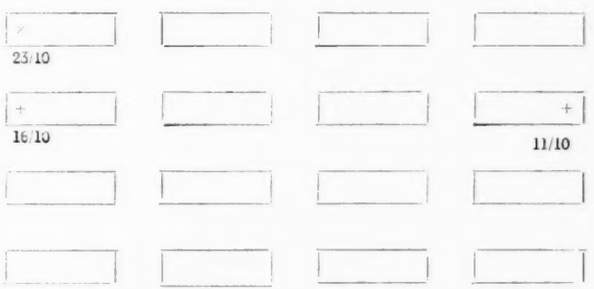
Situation of Clinical Cases (5) and Infected Contacts (3) in Classes 5 and 6.

153 scholars: 13 examined (by swab): 3 +.

Class 5.



Class 6.



+ Clinical case. × Infected contact.

RETURN CASES.

The carriage of infection by patients who have recovered and have been discharged from hospital is well recognized, but, speaking generally, the experience of the fever hospitals in Glasgow is that the spread of infection in this way appears to be very limited. In the last three and a half years the return cases of diphtheria have amounted to 30, giving an average of 8.5 per annum. On the total cases admitted to the hospital in that time this only represents a percentage of 0.8 ,which is just five times less than the percentage of return cases of scarlet fever. These cases may be said to stand in the same relation to the community as infected contacts. It is interesting to observe that the period in which infection takes place from the return cases which I have cited ranges from 1 to 43 days, and averages 12 days. In scarlet fever, which may be mentioned by way of contrast, this average period is found to be 7 days. Taking four families in which there were return cases this year, an analysis shows that the number of days between date of return from hospital of first case and the sickening of the second case was 32, 6, 9 and 1. In the Mason family (I) it will be observed that there is a very clear case of infection, but delayed for about a month. In the Hogg family (II) two return cases resulted from a first case harbouring the bacillus (virulent) in both throat and nose. In the Barclay family (III) we have one clinical case and three contacts infected from first case, affording another example of nasal infection. In the Bannerman family (IV) the first was a missed case, which gave rise after more than a month to two clinical cases, one of whom in due time brought back the infection from hospital to a child in a neighbouring family.

Record of Return Cases of Diphtheria.

Year.	City Fever Hospitals.
1906	12
1907	4
1908	6
1909 (six months)	8
	30

This represents 0.8 per cent. of the cases admitted to hospital.

[1] *The Bacteriology of Diphtheria*, 1908, p. 421.

Return Cases.

CASE I.—James M., aged 9, was admitted to hospital, February 3rd. Swabs taken, February 6th, from his mother and his brother Charles proved negative. On March 27th James M. returned home, and Charles fell ill a month later, swabs examined April 28th proving positive. Swabs taken from the five contacts with this return case were all examined about a week later, May 3rd, and all proved negative.

CASE II.—Thomas H., aged 3, fell ill on March 18th; was sent to hospital with diphtheria on March 22nd, and returned home May 1st. A week later his sister, Helen H., aged 5, fell ill; the following day (May 8th) swabs from the throat showed virulent bacilli, and she was sent to hospital, where she was followed by her mother next day. Meantime swabs were taken from the throat and nostrils of her brother Thomas and showed virulent bacilli.

CASE III.—William B., aged 4, was sent to hospital with diphtheria March 23rd, and returned home May 1st. Nine days later David B. sickened, and was likewise sent to hospital. Swabs were then taken of the whole remaining family—seven persons. William B., the original case, showed virulent bacilli in his nose, but the throat swab was negative. His mother likewise showed virulent bacilli; and also a sister and brother, but the swabs taken from the remaining three members were negative. One of the children showing virulent bacilli was a twin; swabs from its fellow were negative.

CASE IV.—Jeannie B., aged 14, sickened March 27th. Ina B. sickened April 4th, and giving a positive swab April 8th was sent to hospital, where she was followed by George B., who gave a positive swab April 9th, swabs taken from three other members of the family on the same date proving negative. On June 6th George and Ina returned from hospital, and the following day a child living near the family fell sick; one of the children sent back from hospital swabbed five days later gave a positive result.

CARRIER CASES.

Infecting Power.—The infecting power of a positive contact or carrier appears to be very limited, as has already been indicated in connexion with return cases and school children. In the school children we see as it were the infection of the contacts, but very little evidence that they in turn passed on the infection to others. In this connexion it may be observed that infected contacts rarely develop the disease themselves—a fact which accords remarkably with my experience of cerebro-spinal fever contacts, 26 per cent. of whom were positive without in a single instance developing the disease. The positive contact's power to infect has been amply demonstrated, but it must be admitted that the accident is much more rare than might be anticipated from the large proportion of infected contacts in the community. The number of possible infectors is also considerably reduced when we consider that it is only likely to be persons harbouring virulent bacilli that are capable of infecting others with disease-producing bacilli.

Segregation of Carriers.—In a disease of such a short period of incubation and rapid clinical course the development of prophylactic measures is always a matter of importance. The segregation of infected contacts and other carriers of infection has accordingly aroused the keenest interest and even controversy, for however desirable it may appear in theory it is attended with much difficulty in practice. Any hard and fast procedure is not warranted from our present knowledge of the subject bacteriologically, nor so far as I can gather from clinical experience.

III.—DUNCAN FORBES, M.D.Edin.,
Medical Officer of Health, Brighton.

THE ADMINISTRATIVE POINT OF VIEW.

THE clinical and bacteriological aspects of latent diphtheria infections having been ably brought before us, it only remains for me to deal with the matter from the administrative point of view.

Legal Powers.

All administrative action depends to some extent upon legal powers, and the first essential is to have clearly before our minds how far one can legally proceed. Section 126 of the Public Health (England) Act, 1875, and Section 56 of the Public Health (Scotland) Act, 1897, give powers with regard to "Any persons who, while *suffering from* any dangerous infectious disorder, expose themselves," etc. Section 52, Part 4, of the Public Health Acts Amendment Act, 1907, is as follows: (1) "If any person knows that he is *suffering from* an infectious disease he shall not engage in any occupation . . . unless he can do so without risk of spreading the infectious disease."

In each of these sections and in others relating to infectious disease it is specified that the person must be "suffering from" the infectious disease, and prima facie definite illness seems to be implied. A strict interpretation of the words "suffering from," however, might lead to awkward consequences. In our fever hospitals many cases of scarlet fever and diphtheria are detained, not because there is any clinical manifestation of disease, but because, in our opinion, they remain in an infectious condition. If any such patient left hospital against advice prosecution would probably follow, although he is not suffering from the disease. When one remembers that the diphtheria carrier is like the above-mentioned fever patient—in an infective state although not suffering from the disease—one considers that legal powers are equal with regard to the two classes. As a matter of fact one takes no action excepting peaceful persuasion with healthy diphtheria carriers. This is not only because of the weakness of the legal position, but because no difficulty is experienced in having a large majority of known cases isolated, the few who refuse to take precautions being after all only a small percentage of diphtheria carriers at large. The more dangerous of these few are school children, and one always excludes such carriers from school and in this way considerably reduces their infective powers (Public Health Amendment Act, 1907, Section 57, or other powers).

Hitherto one has talked of healthy carriers who have had no illness; in carriers, on the other hand, who have a history of *recent sore throat or cold* one makes an effort, usually a successful effort, to get the general practitioner to notify. One works on the theory that diphtheria carriers with sore throats or nasal catarrh are much more infectious than healthy diphtheria carriers. Up to the present one has always been successful in having such cases fairly well isolated.

In concluding what has to be said regarding the legal aspect one would hope that in future Acts the word "*suffering*" will be omitted and be replaced by the phrase "*in an infective condition.*" This would give the necessary discretionary power to medical officers of health and clear away the present ambiguity.

Swab Taking.

The next matter of general interest is the taking of swabs. In a majority of cases swabs from the throat only are taken. Graham Smith[1] gives a table showing the proportion of persons infected with morphologically typical diphtheria bacilli in the nose, the throat being free, according to which 1.9 per cent. of contacts in schools had the nose infected while the throat was free.

Consideration of such a table alone should convince any one of the necessity of taking swabs from both throat and nose. In this connexion the obvious fact that diphtheria bacilli lying on tonsils have much fewer chances of passing to another person than bacilli on the nasal mucous membrane should be considered. Up to the present too little attention has been given to the probability that nasal diphtheria is much more infectious than throat diphtheria.

During the taking of swabs a careful study should be made of the parts from which they are taken. This is especially so in the nose; one cannot fail to see one-sided nasal soreness, and naturally inquires as to the presence of blood-stained secretion. These signs arouse grave suspicion, but one may easily miss fibrinous rhinitis if one does not examine the nose carefully. The membrane or exudate in many cases of fibrinous rhinitis is crowded with diphtheria bacilli; but if one does not rub the swab on the membrane in such cases one may find no diphtheria bacilli in the culture. Apart, therefore, from the risk incurred by not having such cases isolated at once,[2] there is the additional chance of no diphtheria bacilli being found in the culture and the case being missed altogether.

Where much secretion is coming from the nose this should be wiped away before the swab is applied to the mucous membrane. It has frequently been found that the swabs from the secretion contain no diphtheria bacilli, whilst swabs direct from the mucous membrane do. In

[1] Page 196.

[2] In presence of diphtheria, cases of fibrinous rhinitis, and also cases of unilateral sore nose in contacts, should be isolated at once without awaitin the swab results.

taking throat swabs, if a spatula is not objected to it should always be used, the swab being applied to the tonsils and adjacent parts only; in children who are afraid, however, a more satisfactory swab is got without the tongue depressor, the doctor being better able to control the movement of the child's head.

A practical question which sometimes leads to friction is, On whom should devolve the duty of taking swabs?

My routine has been to personally take swabs in the school, to take swabs also from absentees at their own homes who were not, at the time, being attended by a doctor. In cases notified from public dispensaries the dispensary doctors usually prefer me to take any necessary swabs from other members of the family. In practically all other cases the general practitioner is asked to take swabs.

Contacts.

The administrative measures for dealing with contacts depend on the situation of the primary cases. A few examples are given:

1. *Primary Cases in a Children's Hospital.*—In such cases the immediate orders are: (*a*) Keep all patients in bed; (*b*) keep the same staff on duty; (*c*) admit no new cases; (*d*) if possible exclude visitors; (*e*) use no douche or spray until after the swabs have been taken. Having thus prevented in great measure contact between the infected and non-infected, one proceeds to swab the patients and staff. All patients found to be diphtheria carriers are isolated. If one could regard the swab result as an infallible guide, one would at once admit fresh cases to the ward, but in ordinary practice one discharges all cases as quickly as possible, cleanses the ward and reopens it for fresh cases.

2. *Primary Cases in the Home.*—If one takes it that from 10 to 50 per cent.[3] of contacts in families are diphtheria carriers, one at once realizes with what large numbers one has to deal. In Brighton contacts in the home are swabbed only under exceptional circumstances. All members of families are swabbed: (*a*) If any member is a teacher or other person associating with children outside the home; (*b*) if any member sells or handles milk. Individuals are swabbed (*a*) if they are known to have had cold or sore throat; (*b*) if suspicion rests upon them as probable carriers—for instance, four cases of diphtheria had occurred in a Brighton school; a case was notified of a child of 3 who was not at school, but whose sister attended the school in question. A positive swab was obtained from this sister.

By taking swabs from such a small percentage one is well aware that many diphtheria carriers are missed; therefore, exclusion from school is enforced for four complete weeks after the removal of the case to hospital, and the parents are advised to keep the children separate from others during that time.

3. *Primary Cases in School.*—In schools in which diphtheria has occurred, according to tables collected by Graham Smith,[4] over 8 per cent. are diphtheria carriers.

Our first action in such cases is to make inquiries at the school as to absentees from the same class who returned shortly before the onset in the patient. If such are found, and if a history of sore throat or cold is elicited, swabs are taken. Swabs are also taken from all scholars present or absent in whom there is a history of sore throat or cold. [All absentees from the class are visited and inquiries are made as to the nature of their illness.]

Even if the swabs are returned negative all persons with sore throat are excluded for a clear fortnight. The theory on which this action is based is as follows: A diphtheria carrier who has a sore throat, because of the presence of other virulent infective organisms (usually cocci) in the throat, is much more infectious than a carrier of diphtheria bacilli alone. I believe indeed that in the absence of other virulent organisms diphtheria bacilli seldom infect. It is obvious that if the above is our working hypothesis we must exclude children with sore throats for a time, even although their swabs show no diphtheria bacilli, as these sore throats might provide complementary infecting agents.

In the presence of only one or two cases no further action is taken, and usually no further cases occur. On the occurrence of more than two cases in an infants' class one considers the advisability of swabbing and clinically examining the whole class, and this is frequently done.

Instructions given to the school teacher include the use as far as possible of separate pencils, etc., by each child, and at times instructions are given to stop singing lessons.

Isolation of Infected Contacts.

Having described the administrative procedure used in the discovery of diphtheria carriers, one now proceeds to make a statement regarding the action taken by various authorities with regard to isolation.

In Brighton infected contacts are sent to the diphtheria wards. Except in the case of adults, antitoxin is usually injected on admission, and generally the contact is treated similarly to diphtheria patients, three negative swabs being obtained from nose and throat before discharge. During the last year fourteen such contacts were removed to the Infectious Diseases Hospital for periods varying from 9 to 80 days, the average stay being 33 days. Six of these, aged 5, 12, 14, 21, 27, and 30, had no antitoxin during stays of 25, 20, 20, 16, 16, and 9 days respectively, with no bad results, the remainder, aged 8 months, 2, 3, 6, 6, 7, 10, 12, had 4,000 units on admission, and their lengths of stay were 52, 54, 29, 64, 26, 24, and 20 days respectively.

If objection is raised to removal to hospital the child is left at home, the parent is advised to keep the child apart from other children, and four weeks' exclusion from school is enforced. At the end of that time the child may return, after two sets of swabs from nose and throat giving negative results have been obtained.

In Cambridge a private house was rented in 1900 for the isolation of carrier cases. One takes it that this was done in order that parents might more readily consent to have their children isolated, and also that these might not pick up fresh infection from acute cases. When one considers the inconvenience and expense caused in the providing of nurses and maids when this home is in use, and also the yearly rent of the house, one would look for substantial benefits to recompense for such an outlay. During my stay in Cambridge, acting on my Manchester experience, I introduced the method of treating diphtheria carriers along with diphtheria cases in the Infectious Diseases Hospital, and in most cases found no difficulty in having such persons isolated. I believe that at present the rented house is simply used as an overflow from the hospital. Below a note is given of the number of contacts isolated at the private home and their length of stay there:

Weeks isolated...	...	-1	-2	-3	-4	-5	-6	-7	-8	-10	-10	
Actual numbers	...	16	53	53	26	14	11	9	4	5	5	196

The 5 cases over ten weeks stayed for periods of 74, 97, 110, and 122 days respectively.

Of the 196 cases, 141 had 500 units of antitoxin on admission, 17 had 2,000 units, and 38 had none.

Twelve of the cases were for a longer or shorter period nursed in the diphtheria wards.

None of these 196 cases developed clinical diphtheria.

The Bristol methods can perhaps best be grasped by perusal of Dr. Davies's Annual Report for 1902, pp. 49–52.

The unsuspected cases upon bacteriological examination resolve themselves into two groups:

1. Those in which the bacillus is found in characteristic growth, needing care in hospital (diphtheria "carriers").

2. Those in which the short forms (Hofmann, pseudo?) are found, mostly in the nose. . . . They are not in our opinion suitable cases for isolation. . . . Home treatment amongst a working-class population in the case of a disease producing no obvious illness is apt to be imperfect, and for these "suspected carrier" cases we arranged at Avonmouth an out-patient service at the isolation hospital for the proper application of antiseptic washes, . . . each child being furnished with a card spaced for a fortnight, at the end of which a further bacteriological examination is made to determine readmission to school.

In Bristol diphtheria bacilli bearers are isolated in the Infectious Diseases Hospital or by their medical attendant; children who have been in direct association with cases of clinical diphtheria (in home or at school), and who are Hofmann bacilli carriers, attend an out-patient department at the Infectious Diseases Hospital or elsewhere. The establishment of special out-patient departments is only in force during epidemic prevalence of diphtheria. The difference in administrative procedure between Brighton

[3] Graham Smith, page 183
[4] Page 187.

and Bristol is that whilst Hofmann's bacilli contact[5] carriers are disregarded in the one they are medically attended in the other.

In both towns morphological and cultural characteristics are in the main relied on to distinguish true diphtheria bacilli from allied forms.

In disregarding Hofmann carriers, although contacts of true diphtheria cases, one relies on the facts ascertained by the bacteriologist.

The principal of these are mentioned below:

1. The immunization of animals with Hofmann's bacillus does not confer any protection against diphtheria bacilli injected subsequently.
2. The local reaction in guinea-pigs produced by the subcutaneous injection of large doses of pseudo-diphtheria bacilli is not influenced by the injection of antitoxin.
3. Considerable doubt is thrown by Petrie[6] on the production of toxoids by Hofmann's bacillus.

Again, one would be inclined to attach more importance to Hofmann's bacillus were it not that so great a number of true diphtheria bacilli carriers are present during every outbreak of clinical diphtheria, and those appear rarely to give rise to clinical cases. In this connexion a letter of May, 1909, from Claude B. Ker of the Edinburgh City Hospital is of considerable interest.

> It is the case that return cases of diphtheria were practically unknown in Edinburgh during the period that no cultures were taken before the patients were discharged. Nevertheless, when five years ago our laboratory was opened, it was felt that cultures were necessary, if only to keep in touch with medical opinion. Since then, therefore, cultures have been taken as a routine, and the object has been to obtain two negative cultures (consecutive) before the patient is allowed home. We have not hesitated, however, in the light of our previous experience, to discharge the small minority of patients in whom, after six weeks' detention, the cultures remain steadily positive. One or two "alleged" return cases have resulted, certainly not more than 4 in five years, and in every case as it happens negative cultures had been obtained from the discharged case.

J. H. Meikle[7] mentions the discharge of 27 diphtheria bacilli carriers without the occurrence of a return case (in five cases, however, experiments on rabbits gave no proof of virulence). In Manchester, where until recently[8] only one negative swab was obtained from the throat and nose before discharge of diphtheria cases, and where therefore many diphtheria carriers were discharged, Dr. Niven tells me that the number of return cases was trifling. In view of the Edinburgh and Manchester experience one cannot regard it as a rash line of action to take no notice of Hofmann carriers; indeed one would go further, and disregard morphologically typical organisms avirulent to guinea-pigs were it not that at present the work of proof of virulence cannot be overtaken.

Prophylactic Use of Antitoxin.

One now passes to the question of the prophylactic injection of antitoxin. The main object in avoiding such injections is in order that carrier cases may not be created. It has been proved that antitoxin has no influence on length of infectivity. It is, however, probable that attacks of diphtheria in contacts are rendered milder by such injections, and are therefore the more readily overlooked. It follows that extensive injection of antitoxin would lead to the non-isolation of certain highly infective individuals. Other deterrents to such injections are the expense, the trouble, and the friction likely to be caused by adopting such measures. Neither must it be forgotten that itching rashes with temperature and joint pains may follow even small doses; more recently attention has been called to the disadvantage of "sensitizing" contacts. One at present warns the parents of the great danger of not calling in a doctor at the *onset* of even slight illness in any other member of the family.

A natural question which arises is, If prophylactic injections of antitoxin in the home are not advised, why should one give healthy carrier children any injection on admission to the diphtheria wards? It would, in my opinion, be much better not to do so, but as one usually states to the parent that there is practically no risk of even slight illness, one has in these cases to consider the individual rather than the public health of the community. No carrier case has in my experience ever developed diphtheria during isolation, but if any one of them had developed an attack and no antitoxin had been injected, one might have been accused of taking unnecessary risks.

Before concluding, it should be mentioned that the administrative procedure outlined is that which appears suitable for urban districts in which whole-time medical officers of health are employed; in my experience the action recommended produces a maximum of benefit with a minimum of labour and expense.

[5] Contact with true diphtheria cases.
[6] Graham Smith, p. 224.
[7] *Edinburgh Medical Journal*, December, 1906.
[8] Two consecutive negative swabs are now required from throat and nose.

IV.—Dr. R. VEITCH CLARK,
Assistant Medical Officer of Health, Leeds.

LATENT DIPHTHERIA AND ITS ADMINISTRATIVE CONTROL.

DR. R. VEITCH CLARK described certain outbreaks with which he had had to deal. They fell into three classes: (*a*) Latent diphtheria in elementary schools; (*b*) latent diphtheria in institutions, for example, orphanages; (*c*) latent diphtheria in members of individual families.

Latent Diphtheria in Schools.

Of the first class he described[1] two instances, saying: The course of the first outbreak was as follows. The outbreak began in December; in January there were 16 cases in the two schools; under the ordinary administrative measures the case incidence fell to 7 in February, to 5 in March, to 3 in April and to 1 in May. In June and July, however, there occurred a sudden recrudescence; the cases rising to 15 in June and to 27 in July. In August, again, there occurred 20 cases, although the schools were closed on vacation. The two schools were, therefore, kept closed until the beginning of October, and during September the noses and throats of the children were swabbed and the swabs examined for the diphtheria bacillus. Seven hundred and sixty-nine children were so examined; in 18 of these, or 2.3 per cent., the diphtheria bacillus was found; 11 of these 18 children were found to have albuminuria and had probably, therefore, suffered from a mild unrecognized attack of clinical diphtheria. All the 18 children were isolated. In October and November the case-incidence continued to diminish, but in December there was a slight rise again.

The recognition and isolation of these eighteen infected cases probably prevented a great increase in incidence of diphtheria in the latter part of the year, so that the procedure adopted was thereby justified. I think, however, that the diminution of case-incidence should have been much greater in October, if all the infected persons had been got hold of. The most likely reason for the continuance of the disease appears to me to be that other members of the families than the children at school were infected.

The second of the school outbreaks I will not give in detail. It will suffice to say that for several weeks from two to five cases of diphtheria occurred amongst the school children each week. An attempt at bacteriological examination of the children was rendered futile, owing to the great number of absences resulting from the very severe weather. Only thirty-seven children were so examined, and of these only in one case was a positive result obtained.

The sequel to this second outbreak was very interesting; about a month later the district in which the children of the school referred to lived was visited by an outbreak of very infectious sore throat. Clinically, the condition was very transient—the patient suffering from general indisposition and a slight sore throat, with or without patches, for only one evening in the majority of instances. When one member of a family was so attacked the condition, as a rule, spread through the household. In one street of thirty-three houses only three families escaped. Only a few of these cases came within the ken of the public health authorities, but of these a considerable percentage were proved to be diphtheria bacteriologically.

Latent Diphtheria in Institutions.

Investigations were made into the occurrence of latent diphtheria in a union infirmary, and in an orphanage. These differ from schools in that the people dwell in the

[1] The author illustrated the first of these outbreaks by a graph.

buildings, the conditions of life approaching more nearly those of a family. In the infirmary there occurred two cases of diphtheria. The throats of all the residents—115 in number—were then examined bacteriologically; 18 positive contacts—that is, about 16 per cent.—were found, and these were isolated forthwith. No further case occurred. In the orphanage four cases of diphtheria occurred in one month, all the inmates, of whom there were 91, were examined, and a positive result was obtained in 16, that is, about 17 per cent. The positive contacts were isolated, and no further case was recorded.

Latent Diphtheria in Families where a Case of True Diphtheria has occurred.

Graham Smith has shown that where a case of ordinary clinical diphtheria has occurred in a family the percentage of positive contacts amongst them is larger than it is in school infection. I have found it difficult to obtain accurate statistics on this point, but my experience supports strongly this view. Thus, in one family, three members had true diphtheria, and the remaining three gave positive results on bacteriological examination; in another family of seven, two cases occurred, and the other five members were positive contacts; in a third instance, in a family of twelve, six had diphtheria, and other five had the bacilli in their throats; again, one child in a family of eight suffered from diphtheria, and two out of the remaining seven had the latent form of infection. Other instances might be given. I do not give a percentage for these cases, as the basis of calculation is too small to justify it.

Administrative Treatment of Positive Contacts.

All positive contacts should be isolated. Isolation was practised in all the instances mentioned in this paper. Where isolation is impossible at home, contacts should be removed to the isolation cottages, not the wards, of the fever hospital; such isolation should always be practised in school and institutional outbreaks. The necessary period of isolation, along with local treatment, varies in my experience from one to seven weeks; the length of the period of isolation depends evidently upon the virulence of the bacillus. In most cases, where the period of detention exceeds three or four weeks, I have found that there is other evidence pointing to an unrecognized attack of mild clinical diphtheria.

Conclusions.

The outstanding conclusion to which the preceding observations lead is that the incidence of cases of latent diphtheria is greatest where personal contact is closest.

We know also that the method of passage is the most effective way of increasing the virulence of an attenuated bacillus; given, therefore, a feebly resistant victim infection from a case of latent diphtheria may at any time give rise to an acute attack. To control the spread of diphtheria by latent cases, therefore, I am of opinion that the only thoroughly efficient procedure is to examine bacteriologically the throats of every member of a family where a true case of the disease has occurred, and to isolate those from whom a positive result is obtained. I have always found the members of the profession willing to help by taking the swabs. The great objection, of course, is the cost to the local authority; this would, I am convinced, only be great at first. I have made a calculation based on the returns for one year of six large English towns, and find that about 150 cases of diphtheria occur for every 100,000 of population in the year. If the average family be taken as consisting of six people, that would mean 900 swabs examined per annum, which at 2s. 6d. per swab means between £110 and £115 per 100,000 of population per annum. The cost of isolation of contacts is to be added to this, but both of these sources of expenditure would be diminishing ones, for the procedure advocated would very greatly lessen the total diphtheria case incidence, and should absolutely abolish large outbreaks. It is not desired in any way to minimize the importance of general disinfection, for the spread of diphtheria by contaminated objects, even after the lapse of considerable intervals of time, is proved beyond a doubt, and must always be provided against. In conclusion, the necessity must be emphasized of never certifying a diphtheria convalescent as free from infection until two consecutive bacteriological examinations have given negative results.

DISCUSSION.

Dr. KNOWLES RENSHAW (Manchester) said he would like to say a few words in support of the taking of a virulence test, as advocated by Dr. Watson Williams, and would refer to an illustrative case in which if this had been done much mental distress would have been prevented. At a private school there was an outbreak of diphtheria. The school dispersed, and before the scholars returned, when the epidemic had subsided, cultures were taken from all the throats (only) and found to be negative. A fresh outbreak occurred within a fortnight, and on cultures being taken from every nose and throat in the institution it was discovered that one of the scholars, who had only suffered from a slight rhinitis, had virulent Klebs-Loeffler bacilli in his nose. To make matters worse the head master himself took diphtheria. When he had recovered and again wished to reopen the school it was found that, although perfectly well in health, he had still Klebs-Loeffler bacilli in his nose, and, despite vigorous local treatment, the presence of the bacilli in his nasal cavity was demonstrated every time a culture was taken. At last, after waiting several months in despair, he determined to reopen his school, and did so without any further epidemic occurring. Had the virulence test been applied in this case he would probably have been able to reopen his school with a clear conscience at a much earlier date, and would have been saved much pecuniary loss.

Dr. DAN MCKENZIE (London) thought that two lessons of great importance were conveyed by what had been said. In all cases suspected of diphtheria swabs should be taken from the nose as well as from the throat; and when diphtheria bacilli were found in "carriers" the virulence test should be adopted before the individual was submitted to isolation, etc.

Dr. E. W. GOODALL (Homerton Fever Hospital) considered return cases of diphtheria not worth discussion. In the treatment of convalescents it did not matter a bit, in his opinion, whether swabs were taken or not. He only did it himself in order to comply with the requirements of the medical officer of health. He considered it unnecessary to empty and disinfect wards in general hospitals when an accidental case of diphtheria occurred. He believed prophylactic injections of antitoxin to be quite unnecessary, and he was sure that they were occasionally dangerous.

Dr. HERBERT JONES (Hereford) said that his experience in Herefordshire led him to agree with Drs. Davies and Heaven of Bristol, that in the presence of an outbreak of diphtheria Hofmann's bacilli must not be ignored. It seemed to him that in connexion with the spread of diphtheria through schools the best thing would be, when there was even a single case, to make that school an open air school. More and more they were coming to the conclusion that infection was personal, and they were more likely to have it spreading in crowded schools. If they got the children in such a crowded school into the playground, no doubt it would not be altogether necessary to isolate the actual diphtheria contacts.

Dr. STCLAIR THOMSON (London), President of the Laryngological Section, asked for clearer directions as to the duty of the private practitioner as regards (*a*) the danger of carriers, and (*b*) their treatment by antitoxin. Was the latter useless both in shortening the sojourn of Klebs-Loeffler bacilli in the nose and pharynx, and also in mitigating the risk of their spreading infection?

Dr. CLEMENTS (Batley) referred to the value of the morphological test in determining whether a bacillus was a true diphtheria bacillus or not. For ordinary routine work he found that an examination by microscope after twenty-four hours' incubation in blood serum was sufficiently accurate. Westbrook's classification was a useful working one, and all bacilli conforming to the C, D, and D_1 types could be safely regarded as true diphtheria bacilli. Those which could be grouped under the D_2 type, the Hofmann type, could be disregarded. Occasionally he had met with a virulent case of diphtheria which on repeated swabbing revealed only the Hofmann type of bacillus. The differential culture test which he regarded as of most value was the production of acid. He had never found the Hofmann type of bacillus capable of producing acid in sugar media. Prophylactic injections were of some value, but owing to the low degree of infectivity of this disease, it was difficult to come to accurate conclusions on this point.

He had never seen bad results after injecting with horse serum a patient who had previously received a sensitizing dose. He was aware that experiments on animals showed the danger of giving a second injection of horse serum after an interval from the first injection; but although he had given attention to this aspect he had never seen any evil results.

Dr. Andrew Wylie (London) said he would like to ask Dr. Watson Williams if he would operate on a mastoid or sinus case if the diphtheria bacillus was found in the discharges. Would it not be inadvisable to operate on account of the danger of complications occurring from infection?

Dr. Robert Mowbray (Castlederg) said he desired to point out that the less an epidemic was interfered with the quicker was the susceptible material exhausted. The fact that diphtheria cases were now almost always with them in sporadic rather than epidemic form was due to susceptible persons being carefully guarded. Lately an epidemic of epidemic roseola occurred in his neighbourhood, and it took some time before the cases were diagnosed from diphtheria.

The President (Dr. Louis Parkes) said he agreed with Dr. Goodall's views as to administrative methods, and thought that it was not justifiable to send contacts to diphtheria wards. The diphtheria bacillus was much more virulent in times of epidemic prevalence of the disease than under ordinary conditions; and, while special measures might be required to cope with an epidemic, in ordinary circumstances he did not consider that either isolation of contacts or systematic swabbing of throats was necessary.

Dr. Watson Williams, in his reply on the discussion, said that as to performing a radical mastoid operation in a part infected with diphtheria he had had no actual experience to go by, but that he would certainly avoid doing an operation in an infected area unless the circumstances rendered such an operation urgent. He would except from this statement cases in which the organism present was proved to be non-virulent and those in which the infection was chronic. He had heard of a case in which the radical mastoid operation was performed on a diphtheritic ear, but neither the true nature of the supposed diphtheritic organisms nor their virulence had been tested. He always ignored Hofmann's bacillus in cultures of contacts. He had found them in the noses of many patients in wards exposed to a chance case, but there was an equal proportion of Hofmann cultures taken in other wards where the patients had not been exposed to infection. He thought that the suspicions of Hofmann's bacillus that were entertained by some of his Bristol colleagues arose from their unfortunate experience with so-called Hofmann's cases at a time when the organism was less readily identified, the cases being probably true diphtheria. As to what should be done with contacts found to be infected by cultural tests but otherwise healthy, he was strongly opposed to placing such persons in diphtheria wards, because they might be acutely infected by the other patients, and certainly they ran the risk of organisms reinfecting their nasal passages. Such persons should be isolated at home or watched for a few days. He had had no experience of diphtheria in fever hospitals, but was convinced that cultural tests were essential in controlling outbreaks of diphtheria in public schools. The spread of diphtheria was more readily controlled than was sometimes believed, for at the Bristol Royal Infirmary and at many other large general hospitals, up to a few years ago diphtheria cases were treated in the common wards, and never once in his experience did diphtheria spread there from one patient to another. He advised, and had practised, the administration of antitoxic serum by the mouth for prophylactic purposes; it could be given with a little peppermint water, and the patient need never know that it was anything but an ordinary dose of medicine, while the risks, if any, of giving the serum hypodermically were thereby avoided.

Dr. Buchanan, in reply to Dr. Clements's question as to the value to be attached to morphological tests, said that routine diagnosis depended upon them entirely. When it was necessary to have absolute diagnosis the virulence test was necessary. The form of the bacillus, as he had shown, depended to a great extent on the medium. When the morphological test was in doubt a tentative opinion was given until the virulence test had been applied. He attached no importance to the Hofmann bacillus.

Dr. Forbes, in reply to Dr. Goodall, said that in outbreaks of diphtheria in a scarlet fever ward where one had direct control of the patients, one might admit other cases of scarlet fever, but in children's hospitals not under the charge of the medical officer of health it was safer to clear the ward before admitting fresh cases.

ON THE ENDEMICITY OF INFLUENZA.

By A. W. Gilchrist, M.D.,
Nice.

[Abstract.]

If any doubt existed last year as to the expediency of reading a paper in this Section on so commonplace a subject as influenza, it would disappear, I think, on considering the disastrous effects, economic even more than vital, that accompanied the recrudescence of the affection during the past winter.

1. A disease generally recognized as influenza has prevailed continuously over a wide extent of the civilized world for the last twenty years.

2. Although bacteriologists have failed to assign a distinct specificity to the disease there is no doubt of its being susceptible of clinical recognition and characterization.

3. At the Toronto Meeting in 1906 the writer pointed out a certain number of general analogies between tuberculosis and influenza. The form of the latter disease which has been observed and described during the last winter, a form often involving the lymphatic system and affecting children who have hitherto enjoyed a comparative immunity from the disease, tends to confirm the views then developed.

4. It is incumbent upon those responsible for the public health to inquire into the conditions that are presiding over the transition of influenza from the pandemic and epidemic into the endemic stage, and discuss the degree of permanency this affection is likely to display.

Bacteriologists have failed to assign a distinct specificity to the disease. This is, perhaps, not surprising. Professor Chauveau of Lyons has recently been investigating the pathogenic properties of invisible microbes, known only by their effects; and Doerr, prosecuting his epidemiological researches in the Austrian Army Medical Department in Herzegovina, has traced a widespread influenzal affection to a *filtrable*, though invisible, virus. These labours point to probable developments in the future. The entity of influenza is being seriously threatened. Professor Curschmann considers there is no doubt that there exists a form of influenza of pneumococcic origin, since cultures from 46 out of 49 cases produced pneumococcic septicaemia in guinea-pigs. Sir F. Semon claims autonomy for a pneumococcal invasion of the throat, "a hitherto unrecorded affection." Dr. Elliott of Chester observed a small outbreak of pneumococcal disease, differing in several essential characters, one would think, from that described by Sir F. Semon, but he also differentiates it from influenza. And so with many other investigations, the tendency being to attribute to micro-organisms with small morphological differential characters a distinct nosological aptitude.

Dr. Emery, in an admirable contribution to a recent number of the *Practitioner*, assumes, I may venture to say, the most philosophical attitude on the subject. Disdaining neither Hippocratic hygiene, nor the venerable authorities of a previous generation, as the impulsive bacteriologist is wont to do, he recalls what we have recently learnt concerning the rôle of the gases of the atmosphere in the virulence of microbes, and implies that some such influence as Sir T. Watson invokes as the origin of influenza may be the underlying specific cause. He supposes for influenza some etiological factor similar to that which is the efficient cause in diseases like scarlet fever.

I have stated that influenza is of sufficient economic interest to command the attention and study of this Section. There is another reason why State medicine should be concerned with the question. It is, as I have already intimated, because influenza, as essentially a disease of the respiratory functions, is allied in importance to tuberculosis. Influenza is the respiratory affection which accompanies, so to speak, the anaërobic tendencies of modern civilization. Like tuberculosis, it is a disease of urban aggregation, and of that life in common which is a growing characteristic of the age. It is the respiratory disease of well-being and plenty, just as tuber-

culosis is the disease of indigence and physiological poverty (*misère physiologique*).

In what way can hygiene contribute to diminish the dangers of influenzal incidence? By a due appreciation of the importance of dietetics and of aëration. By such reflections as Dr. Parkes has presented for our consideration. Maurel has been led to the conclusion that the quantity of nitrogenous substances consumed by France is sufficient to *overfeed all its population;* and if a part of this population is not overfed it is because the other part is doubly so. It is the same with other nations. Erasmus, writing, as is well known, to Cardinal Wolsey's physician, speaks of the deplorable hygienic habits of the English common people. He said that they were utterly regardless of that ventilation so much recommended by Galen, and that they indulged in large quantities of salt provisions, the English people being amazingly fond of salt.

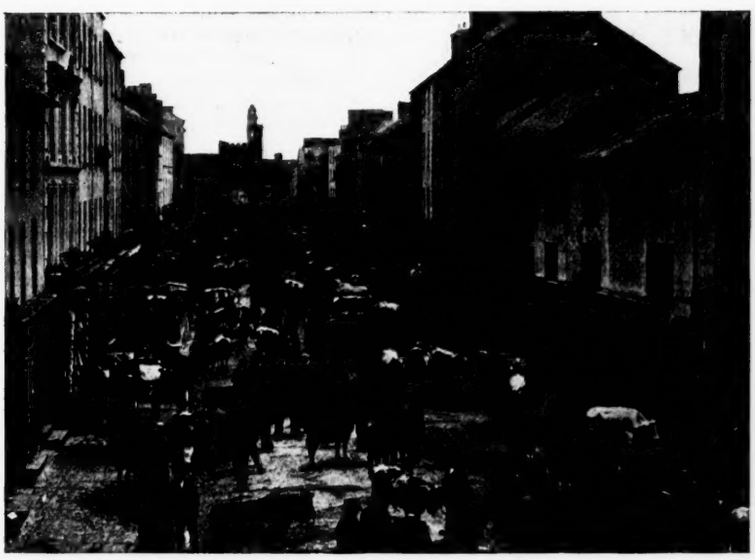
This question of salt, as Widal, von Noorden, and others have taught us recently, is of very great importance. During last winter influenza was characterized, in addition to the disturbance of the cardio-vascular and nervous circulation, by hepatic and renal inadequacy displayed by chloride retention. I saw a fatal case of influenzal bronchopneumonia, in which the chlorides, previously equal to 80 per cent. of the normal, fell to 2 per cent.; and in a case that recovered, but is still convalescent, a fall from 140 per cent. to 4 per cent. Retention of chlorides, I may add, with a high nitrogenous excretion, is of very serious prognostic import.

ON THE CONNEXION BETWEEN CATTLE FAIRS AND TUBERCULOSIS IN IRELAND.

By J. Darley Wynne, M.B., D.P.H.,
Clonmel.

Our views on the causation of tuberculosis, especially of pulmonary tuberculosis, have undergone considerable modification in recent years.

Practically up till the close of the nineteenth century the "inhalation theory" held the field, and it was believed that pulmonary consumption was solely caused by the inhalation of tubercle bacilli adhering to minute particles of dried sputum from the lungs of consumptive human beings. Those who believed in a distinct type of bovine tuberculosis were satisfied to confine the operations of this type of bacillus to cases of abdominal tuberculosis, chiefly occurring in children.



But there were many observers who were not satisfied with this theory, and the researches of Calmette and Guérin in France, von Schering, Oberwath, and Rabinowitsch in Germany, and Schroeder in America, to mention a few among the host of experimenters on this subject, have shown that the lungs can be affected with tuberculosis through the medium of the intestinal tract, the bacilli passing through the stomach and intestines without causing any disease of those organs.

I do not intend to weary you by repetition of facts and experiments with which you are all no doubt well acquainted. I only wish to emphasize the added importance which bovine tuberculosis has assumed owing to all these recent researches. The experiments of Dr. Schroeder of the United States Department of Agriculture have drawn special attention to the infectiveness of the faeces of cattle. He points out that cows do not suffer much from intestinal tuberculosis, but that as they do not expectorate, when they suffer from pulmonary tuberculosis, the tubercle bacilli pass out in their faeces.

Dr. Schroeder has published several interesting pamphlets dealing with his experiments, and the following quotation is an abstract of a paper read by him at the International Congress on Tuberculosis held in Washington, September, 1908.[1]

Tubercle Bacilli in Cows' Faeces.

Dr. E. C. Schroeder, of the Department of Agriculture, Washington, read a paper on his investigations, showing that about 40 per cent. of cattle apparently healthy, and known to be tuberculous only because they had reacted with tuberculin, intermittently passed tubercle bacilli with their faeces. When a number of such cattle were kept under continued observation, the percentage that expelled tubercle bacilli per rectum was found to double in about eighteen months; and both the frequency with which bacilli occurred and the number found in individual animals also showed an increase. Among twelve cows, bacilli in the faeces were at first found in five, but before the end of two years the number had risen to ten. The proof that the acid-fast bacilli demonstrated by microscopic examination actually were tubercle bacilli was established by (1) producing fatal generalized tuberculosis in guinea-pigs inoculated with the faeces; (2) causing fatal generalized tuberculosis in hogs by feeding them with the faeces; and (3) causing fatal generalized tuberculosis in guinea-pigs by inoculating them with milk soiled with small quantities of such faeces, and with butter made from such soiled milk. Pure cultures of tubercle bacilli isolated from the infected guinea-pigs caused fatal tuberculosis in cattle on subcutaneous inoculation. Dr. Schroeder further observed that with rare exceptions commercial milk could be shown on examination to be contaminated with cows' faeces, and he concluded that, considering the wide prevalence of tuberculosis amongst cattle, the presence of faecal material in milk was frequently associated with the presence of virulent tubercle bacilli. Cream and butter were also exposed to this danger.

Dr. Schroeder's conclusions from his experiments prove the contamination of milk and milk products by the faeces of tuberculous cows. I think it is generally admitted now that such contamination is a very real danger. But I believe that other articles of food also may be contaminated by the faecal evacuations of cattle. This brings me to the subject of this short paper, namely, the connexion between cattle fairs in Ireland and the prevalence of tuberculosis. I have not noticed any allusion to this subject in all the flood of literature that has been poured out since the inauguration by the Countess of Aberdeen of the campaign against tuberculosis. In a paper on tuberculosis in the South of Ireland which I wrote and published in the British Medical Journal on May 28th, 1904, I referred to these cattle fairs as a possible cause of the excessive prevalence of tuberculosis in Ireland. The experiments proving the existence of tubercle bacilli in the faeces of cattle confirm my opinion as to the danger of the present system of fairs. This system must be well known to most Irish medical men, but may be a revelation to some of our brethren across the Channel. I am not aware whether the march of civilization and progress has succeeded in stamping out the street cattle fairs in the north of Ireland, but I know that they are almost universal in the South.

The accompanying photograph gives a good idea of the state of affairs. Once a month these fairs are held in the principal thoroughfares of Clonmel as well as in other towns. "From early morn to dewy eve" the streets are a struggling mass of cattle and humanity, and the air

resounds with the lowing of cows and the shouting of men. The shops, in many of which food is exposed for sale, are kept open, though their doors are usually barricaded to prevent the actual incursion of cattle into the premises, but no barricades can prevent the bringing in of filth and faeces on the customers' boots and clothes. Hundreds of cows are herded in the streets, as I have said, for most of the day. They are constantly passing faecal evacuations, which, if Dr. Schroeder's experiments are correct, must contain a large number of tubercle bacilli. Even by the most careful cleansing and disinfection, it would be impossible to banish every one of these bacilli. Knowing full well the habits of the Irish lower orders, it can be no exaggeration to say that after every fair day there must be millions of tubercle bacilli floating about in the dust of the atmosphere, ready to fasten themselves in suitable soils, and thus aid in the spread of the great white plague. Whether we believe that consumption is caught by inhaling the germs of the disease or through the medium of germ-laden food, we can hardly shut our eyes to the fact that these cattle fairs provide a plentiful supply of those germs.

I think I have said enough to establish a case against the holding of cattle fairs in the streets of our towns. The remedy is simple—namely, the relegation of the cattle to properly constructed fair greens outside the towns, where the surface on which the cattle stand should be concreted and the excreta thoroughly disinfected after the conclusion of every fair. The carrying into effect of this remedy may not, however, be so simple, as any proposal of the kind has always met with the strong opposition of the local publicans, who reap a fine harvest every fair day owing to the prevalent custom of clinching all bargains with a drink.

The problem, however, should not be insuperable, and, in my opinion, is one which ought to be tackled at once by suitable legislation.

REFERENCE.

[1] BRITISH MEDICAL JOURNAL, October 24th, 1908.

SECTION OF HAEMATOLOGY AND VACCINE THERAPY.

Sir ALMROTH WRIGHT, M.D., F.R.S., President.

PRESIDENT'S INTRODUCTORY REMARKS.

SIR ALMROTH WRIGHT initiated the proceedings of the Section in an address in which he reviewed the brief past history of vaccine therapy, and discussed its future prospects. Incidentally he expressed much satisfaction that the British Medical Association had thought fit to devote part of a Section to this particular line of work. He commenced his survey of the history of the subject by a reference to Jenner, indicated the parts variously played by its leaders from Pasteur onwards, and showed the fashion in which present methods of dealing prophylactically and curatively with bacterial infections had developed from attempts to produce immunization by use of living but weakened microbes. He held strongly that the employment of tuberculin and all other vaccines should be controlled by blood examinations. It was the systematic use of opsonic tests that had revealed the great importance of the negative phase and the necessity of using very minute doses. The therapeutic results obtained were very encouraging, but the prospects of vaccine therapy being applied still more widely and still more successfully—until it included bacterial infections of all characters—depended on the proofs afforded by future work of the truth of the assumption that a suitable dose of an appropriate vaccine would invariably call into action the natural machinery by which immunization is brought about. A very great deal of work still remained to be done in connexion with this subject. The speaker, in concluding his address, showed that progress was much handicapped by lack of interest in medical research on the part of the public in this country, or, at all events, lack of sufficient interest to induce it to aid it in every way in its power. It seemed absurd that sportsmen were ready to found leagues for the purpose of investigating the cause of grouse disease and lessening its prevalence, in order that grouse moors might not lose value and their pleasure might be interfered with, whereas innumerable persons who suffered from chronic and probably curable maladies—such, for instance, as asthma and some forms of bronchitis—showed no inclination to form antiasthmatic or antibronchitic clubs for the investigation and prevention of the diseases from which they were such grave sufferers.

THE EARLY DIAGNOSIS OF TUBERCULOSIS:

ITS IMPORTANCE IN REGARD TO EFFICACY OF TREATMENT.

By Dr. A. CALMETTE,

Director of the Pasteur Institute, Lille.

THE experimental researches effected during the course of the last few years by J. Bartel, Orth, and Rabinowitsch, by myself, in collaboration with C. Guérin, and recent clinical observations, have established the following facts:

1. The tuberculous infection remains generally localized for a time, long or short, in the groups of the lymphatic glands which collect the lymph from the organ or from the region into which the introduction of the tuberculous bacilli takes place.
2. The rapidity and the intensity of the infection depend to a great extent on the number and virulence of the absorbed bacilli.
3. When the absorbed bacilli are neither numerous nor very virulent, the lymphatic glands which have retained them finish either by destroying them, unless they have produced granulomata, or by a process of apparent cure by calcification, or by fibrous transformation around granulomata already existing.
4. Serious tuberculous lesions result either from a single infection in bulk (acute miliary tuberculosis), or from numerous infections, generally frequently repeated at short intervals: this is why they are very common among bovines in contaminated stables, and with mankind, among subjects constantly exposed to the contagion in the family.

From the preceding, and from clinical teaching on the possibility of cure of tuberculosis at the beginning, it follows that this disease can only be efficaciously treated by establishing a diagnosis as early as possible after the origin of the bacillary infection, that is to say, long before the disorders of function (modifications of the respiratory rhythm, enlargements of the glands, irregularities of the temperature, etc.) have become apparent. For a still stronger reason we ought not to wait for the appearance of the bacilli in the expectorations, for then the extent and the gravity of the lesions are such that they become extremely difficult to cure.

Accordingly we ought to employ the different processes of early diagnosis which are now available. Among these processes we should choose those which, without injuring our patients, are capable of supplying us with the most exact information.

We should then be generally compelled to put aside the employment of subcutaneous injections of tuberculins, because:

1. The general febrile reaction which they produce is accompanied ordinarily by a local congestive reaction around the tuberculous foci which can result in a dangerous diffusion of the bacilli.
2. They can never be utilized among the febrile patients nor among those who present irregularities of temperature.
3. In case of aggravation of the disease it might be, wrongly or rightly, attributed to the injection of tuberculin.

The inconveniences and danger which this method can produce, restrict it to exceptional circumstances in which local tuberculin reactions have only furnished very insufficient information.

More often, it will be advisable to apply one's self, at first, to the cutaneous test (or cuti-reaction) of von Pirquet. If this is positive, we may conclude that the patient is the bearer of either old or new tuberculous lesions.

But the latent lesions and the old lesions which are calcified or fibrous, which present the appearance of being quite cured, are revealed by this test, and this is not sufficient, except among young children up to the age of 3.

We know, in fact, according to statistics recently published, that the number of positive reactions to von Pirquet's test, among the patients apparently healthy, is about 55 per 100 among adults, whilst it is only 4 per 100 among children under 3.

In case of positive cutaneous reaction, it will then be necessary, among adult patients and children of more than 3 years of age, to apply the conjunctival reaction or "*ophthalmo-diagnosis*" test of Wolff-Eisner-Calmette. This test enables us to disclose with more precision the existence of tuberculous lesions actually in evolution. It permits us even to appreciate, to some extent, the degree of the infection, because the reaction is so much clearer and more intense when this infection is more recent, and when the patients defend themselves more vigorously from it.

I shall make no reference at all here to the already well-known technique of this test. So large a number of clinicians of all countries have tried it, and so many works have been published on this subject, that I shall limit myself to stating, in this short address, how it is convenient to interpret its results.

It is now well established that the positive conjunctival reaction reveals in the organism the existence of a tuberculous focus actually in evolution or incompletely cured —that is to say, in which there exists still some living bacilli. The rapidity and intensity of the reaction is in direct ratio to the vigour with which the organism defends itself against the tuberculous infection. The proof of this is furnished by the fact that the more intense the reaction is, the more antibodies does the serum of the patient contain which are capable of fixing the tuberculin *in vitro*, which indicates clearly the reaction of Bordet-Gengou. Among patients who are carriers of lesions which have been caseous for a long time, or which are either very extensive or very virulent (acute miliary tuberculosis and at times meningitis and peritonitis), the conjunctival reaction appeared late or even completely failed. It is almost always negative, as are also the cutaneous or subcutaneous reactions, among the old cachectic tuberculous patients. Among patients apparently healthy the conjunctival reaction is positive in about 18 per cent. of cases. This proportion indicates the average number of the latent tuberculous cases not clinically revealed. Among the clinically tuberculous patients the conjunctival reaction is positive in about 92 per cent. of cases. The foregoing figures are based on more than 20,000 observations.

Accordingly, if the absence of reaction does not allow us to determine the absence of tuberculous lesions, the positive reaction points out the almost certain existence of a bacillary focus of a large or small extent and of more or less gravity. It constitutes, then, a valuable warning for the clinician.

I do not believe that it furnishes, as Wolff-Eisner thinks, any prognostic indications from which we can come to a conclusion, because among certain patients the production of antibodies, which governs the intensity of the reaction, is nowise in relation with the gravity of the disease. But it appears certain that when it becomes negative among patients who formerly reacted positively, and when at the same time we have determined the disappearance of clinical symptoms, it also permits us to determine the anatomical cure of the tubercles. Among children above 3, and among adults, the conjunctival reaction gives us information much more exact and more rapid than the cutaneous reaction of von Pirquet on the presence or absence of active tuberculous foci. Among the febrile patients, it is the only one which can be employed without inconvenience and danger.

It is not correct to say that it is dangerous. Without doubt its use requires many precautions. It is necessary at first to assure ourselves that the eye is in good condition, and to use a tuberculin aseptically prepared and as pure as possible, and to prevent the patient putting any dust under the eyelids or on the conjunctiva with his fingers; and to stop, if necessary, the reaction, if it is prolonged for more than forty-eight hours, with an antiseptic and occlusive dressing. But these measures have nothing exceptional, and when we observe them we can be assured that the ophthalmo-diagnosis presents less danger than the employment of Roentgen rays, or the puncture of a vein for the analysis of the blood.

From more than 20,000 observations already published, I could only find 80 relating to accidents by ulcerative keratitis, or serious conjunctivitis, attributed to the tuberculin conjunctival reaction. And in almost all those cases, it appeared quite evident that the required care had not been given to the patients. Such a small number of bad cases (four in one thousand) should not at all prevent doctors, and their patients, using so valuable a means of information, and which can furnish them with a method of which every one is agreed in recognizing its precision, its simplicity of execution, and its elegance.

Some authors have observed that healthy subjects among whom the instillation of tuberculin into the same eye has been repeated at intervals, react to the second or third instillation, in consequence of a sensibilization or special anaphylaxis of the conjunctiva. From this fact there might result a false interpretation. Nevertheless, experiments on animals, and attentive clinical observations of men and of children certainly not tuberculous, show that in reality this anaphylaxis of the conjunctiva does not exist.

It happens that some patients, who have not reacted to a first test, some days after furnish a positive reaction if we again impregnate their conjunctiva with tuberculin. But then, these patients are surely carriers of a tuberculous lesion, very minute, perhaps, but nevertheless existing; the proof of it can always be furnished by a subcutaneous injection of tuberculin, when the thermic reaction is clearly shown. On the contrary, it is not doubtful that the conjunctiva of the tuberculous patients becomes more and more sensitive to tuberculin if we repeat upon them the conjunctival reaction. At each new instillation, even when they are repeated at intervals of several weeks only, the reaction becomes more and more intense. In very exceptional circumstances, where it would be impossible to employ the conjunctival reaction, we might substitute, instead of this, the methods recently described under the names of "dermo" or "intradermo reaction" (Lautier, Moro, Lignières, Mantoux and Moussu, etc.). But these methods, like the cutaneous test of von Pirquet, appear to have the inconvenience of revealing the latent lesions *non-evolutive*, then consequently we should not be able generally to establish our diagnosis exclusively on the information which they furnish.

It is, then, often necessary and always useful to complete these methods:

1. By the research of the reactions called "reviviscent," which consist in making reappear, among patients who are carriers of tuberculous lesions, a conjunctival reaction, or a local cutaneous reaction, by the subcutaneous injection of a dose of tuberculin unable of itself to produce a febrile reaction (Slatineanu, C. Guérin, Guinard, etc.)

2. By the study of humoral and phagocytic reactions:

(*a*) *Activation of cobra venom* by the serum or by the milk of tuberculous subjects (Calmette, L. Massol, and M. Breton).

(*b*) Deviation of the complement—that is to say, the research for tuberculous *antibodies* in the serum, by the reaction of Bordet-Gengou, made with a tuberculin or with a bacillary extract prepared by the cold method, by concentration *in vacuo* (the tuberculins precipitated by alcohol after evaporation by heat, and the crude tuberculin of R. Koch being unsuitable for this use).

(*c*) Determination of the opsonic index by Wright's method.

The employment of the preceding methods, judiciously combined, associated and controlled one by the other, furnishes us now a sum total of information sufficiently exact to allow us to fix, before the appearance of any functional symptom, our diagnosis with assurance. In a great number of cases these methods will help us also to establish our prognosis, and especially to verify the effects of the treatment introduced by us.

If it were possible to apply them periodically—every six months, for example, from youth—to each member of a family, to each pupil of a school, we should be able to disclose the tuberculous infection after a few days or weeks from its beginning, among the subjects whose health has been entrusted to us. We should then be able to isolate the carriers of bacilli; we should prevent then the repeated contaminations which, as I have shown with C. Guérin, are the chief causes of the aggravation of their disease; consequently, we should put them on the way to a definite cure, and perhaps to an antituberculous immunity, if this can be obtained with mankind, as we have seen it occur among some bovines, by the entire resorption of bacilli.

DISCUSSION.

Professor W. S. SYMMERS (Belfast) said that one great advantage of attending the meetings of the British Medical Association was that they had an opportunity of seeing

and meeting men whose writings had been familiar for years. They had all known Professor Calmette by his writings ever since the old Cochin-China days, when Calmette wrote his articles on dysentery. The paper just read by him that morning would attract the attention of every member of the Association, and perhaps would tend to relieve the doubts of those who more or less dreaded the untoward symptoms that at times arose in the conjunctiva after the instillation of the tuberculin.

Professor WILLIAM OSLER (Oxford) called attention to a practical point in the early diagnosis by the new method. Calmette's and von Pirquet's reactions had been of extraordinary value in the recognition of obscure cases. But the widespread existence of the reaction in apparently healthy persons had been the cause of a certain embarrassment. If Professor Calmette tested those present, it was certain that hardened old veterans like the Chairman and the speaker would react strongly. The difficulty arose in the routine inspection of school children, where the percentage of cases of tuberculosis would depend on the care taken and the methods used. If these were the newer ones of Calmette and von Pirquet, the percentage would be very high. What was to be done with this group? It must be recognized that many members of it were not dangerous, and a clear distinction should be drawn between those with open lesions and those with closed lesions. The former required to be dealt with in a very different way. Those with closed lesions were not dangerous, but the reaction gave a valuable indication for hygienic and dietetic treatment.

Dr. WILLCOX (London) said he had tried the reaction in about 20 cases and regarded it as extremely delicate and a very reliable test. In some cases of tuberculosis in which the disease had been quiescent for years a positive reaction to the test was given. Thus in a healthy adult in whom there were no symptoms of active tuberculosis, and who had had tuberculosis of bone in childhood, a positive reaction was given. In two cases in which the reaction was tried a severe conjunctivitis resulted and lasted two or three weeks, causing some alarm. On the whole he preferred for diagnosis the opsonic index to Professor Calmette's test. In using the former test autoinoculation from the infected area, if one existed, should be brought about. Thus in doubtful phthisis if breathing exercises, such as the blowing of water from one Wolff's bottle into another, were undergone, then a definite variation would be shown if a series of opsonic indices was taken. Physical examination of the lungs was also capable of producing a definite autoinoculation, and if pulmonary tuberculosis was present an abnormal variation was usually shown half an hour after the examination. In cases of local tuberculous lesions such as enlarged glands, joint disease and the like, massage or Bier's method might be used to bring about autoinoculation; a series of opsonic indices would give a sure indication of tuberculous disease if present.

Professor MCWEENEY (Dublin) said that two years ago he had carried out a series of diagnostic inoculations at the Mater Misericordiae Hospital, Dublin, on fifty cases, in most of which tuberculosis was suspected. In each case he had applied both the Calmette and the von Pirquet reaction, using one eye and the opposite arm. He had not the figures with him, but could say that the cutaneous reaction yielded positive or doubtful results in a number of cases that were not clinically tuberculous. But he had never obtained a typical Calmette reaction in any save clinically tuberculous cases, or those which were subsequently shown to be tuberculous. For the Pirquet reaction he used 25 per cent., and for the conjunctival test 2 per cent. Koch's old tuberculin. He had observed unpleasantly vigorous reaction in a few cases—early cases of tuberculous glands in children—and now used 1 per cent. tuberculin for conjunctival instillation. In consequence of the less troublesome application of the Calmette test, he deemed it more suitable for diagnostic work in hospital practice than the opsonic determination. Moreover, a single application was usually sufficient, whereas a series of opsonic determinations had to be made in order to exclude the presence of tubercle. The speaker went on to refer to the case of a young man who had been cured of early pulmonary tuberculosis by open-air treatment on ordinary lines combined with injections of tuberculin in what would now be regarded as enormous quantities. After seven years there had been no reappearance of tubercle bacilli in the sputum. The inference appeared to be that, if the case were taken early, good results could be achieved with what would, in the light of the present discussion, be regarded as obsolete methods of treatment.

Professor ARTHUR H. WHITE (Dublin) considered that many cases of local tuberculosis which seemed to begin insidiously really started with an attack very similar to a typical influenzal one, during which the blood, if examined, would show a high opsonic index to tubercle bacilli. Such attacks might be considered to end in three ways: in general miliary tuberculosis, in a local tuberculosis focus with a low opsonic index, and in complete recovery.

THE INFLUENCE OF THE SITE OF INOCULATION.

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THE mere possibility of successful therapeutic inoculation depends on the fact that the inoculator can regulate the doses which he gives, so as to obtain a preponderance of stimulating effect, with the minimum toxic result. In the natural course of a bacterial infection recovery depends largely on the immunity developed in response to the infection. The stimulus exciting this immunity is provided by the products of bacterial growth within the organism; but the supply of such bacterial matter is not regulated with this end in view, and consequently the immunity produced is often defective. An opening is thus offered to the therapist, who can throw in appropriate supplementary stimuli when necessary. These exogenous inoculations have the advantage that they can be regulated accurately as to dosage, as to time, and as to the site of inoculation.

I wish to speak of the site of inoculation as it affects the immunity produced.

There are three alternative views which may be suggested as to the origin of the antibodies, upon the presence of which antibacterial immunity chiefly depends, and according as we are inclined to one or other of these views so we shall attach a different kind of importance to the selection of the site for inoculation. First, it may be held that the antigen must be absorbed into the circulation, and that the antibodies are formed either in the blood stream or in some as yet undefined tissue which has this special function. On this view the site of inoculation would only be of importance as it determined a more or less rapid absorption into the circulation. Secondly, we may suppose that the power of reacting to the presence of bacterial matter by the elaboration of a specific antibody is one common to all the tissues; so that the chief centre of the activity excited by an inoculation will be found at the site of inoculation, where the stimulus has the greatest intensity. Or, thirdly, the leading rôle may be assigned to the leucocytes, in which case the chief factory of antibodies may be found at the site of inoculation, if this is favourable to a rapid local collection of these cells, or it may be referred back to the blood stream or the leucogenic tissues, if the inoculated material is easily and quickly absorbed. On either of the latter assumptions the site of inoculation is a matter of paramount importance, because it becomes possible to excite an increased immunizing activity, by the application of a localized stimulus, without allowing the inoculated vaccine to circulate through the whole system, with the consequent danger of injuring tissues already poisoned by disease. The two alternative views last mentioned are those best supported by experiment.

It is already an ancient observation that a strictly local infection can confer an immunity in which the whole body shares; one need only mention the old method of smallpox inoculation and preventive inoculation against pleuropneumonia of cattle. More recently a large amount of experimental work has been directed to the object of gaining a rigid proof of the local production of antibodies, by Wassermann and Citron, P. Roemer, v. Dungern, and others; but, though the results all point in the same direction, the required proof is, perhaps, not yet convincing.

With these considerations in view it seemed that one might obtain some useful information by making inoculations at different sites and observing the differences, if any,

between the responses obtained by the various methods. The plan of the experiments was to inoculate normal animals subcutaneously, intravenously, and intraperitoneally with a bacterial vaccine, and to compare the effects produced on the opsonic index. I have left on one side the method of immunization by the gut, as this method has been the subject of a considerable amount of experiment by Colonel Sir William Leishman and his colleagues of the R.A.M.C., who obtained apparently rather disappointing results.

The vaccine used was an emulsion of the *Bacillus pseudo-tuberculosis rodentium* in saline solution, killed by heating to 60°C. for about one hour. Rabbits showed a very striking toleration of subcutaneous injections; the doses given ranged up to 80,000 million per kilogram of body weight, and neither adverse clinical symptoms nor opsonic negative phase were produced. Intravenous inoculation, on the other hand, of only 10,000 million bacilli produced profound shock and an opsonic negative phase. A dose twice this size brought on a marked negative phase. These conditions did not last long, and after an interval of two or three days the animals became lively again, while the negative phase gave place to an energetic immunizing response. It is clear that the larger intravenous doses either paralysed for the time the normal production of opsonin, or else absorbed its opsonic content from the circulating blood. The second alternative appears inadequate to explain so great a fall, because, when we make the experiment *in vitro*, a proportionately much larger quantity of bacterial emulsion is required to deopsonize a sample of normal blood serum; and also because the lowest point of the curve is only reached after a considerable interval of time. I conclude that intravenous injections can temporarily lessen the normal production of opsonin, and that this action is, in part at least, responsible for the negative phase here obtained. However this may be, no such marked negative phase is produced after subcutaneous inoculation—a fact which may be explained by supposing that the vaccine, in this case, is localized in the subcutaneous tissues, and only reaches the general circulation in small quantities.

Now let us pass on to consider the immunizing reaction which follows after the first few days. There is not much difference to be made out here between the two methods of inoculation. In both cases a good response is obtained. That following on intravenous injection seems in most cases to reach a higher level. But I dare not insist too much on this difference, because experiments made at different times are not strictly comparable in this respect. The cultures used in estimating the opsonic index alter in virulence, and this change has a considerable effect on the numerical height of the indices measured. If any conclusion were to be drawn from the greater height of the intravenous curves it would be that there is, somewhere in the body, a tissue more active in producing opsonins than the subcutaneous tissue. But until we know where to find this tissue, and how to reach it without having recourse to the dangerous procedure of intravenous inoculation, it must remain out of court for therapeutic purposes.

It follows from this that subcutaneous inoculations produce a fairly good reaction, whilst at the same time they minimize the risks of inoculation. Intravenous doses, on the other hand, more easily produce harmful results, but also may perhaps give greater possibilities of exciting a high level of immunity. When we come to examine the results of intraperitoneal injections we find a third condition prevails; by this method the disadvantages are emphasized with no corresponding set-off of advantages. The opsonic charts show a predominance of the negative phase, with a very marked diminution of the immunizing reaction. In contradistinction to the curves presented before, these show the possibility of producing a negative phase not followed by any positive phase. It is only by a fortunate choice of dose that a positive phase is obtained at all by this method of inoculation. The vaccine introduced is in a situation favourable to the abstraction of opsonin from the blood because of the abundant circulation of lymph through the peritoneal cavity; it also exerts its toxic effects upon important and delicately organized structures, at the same time it reaches no tissue able to respond to its presence by an energetic production of antibodies.

The point of theoretical and practical importance, which I think is brought out by these experiments, is the possibility of separating the different phenomena generally recognized as integral parts of the response to inoculation. Taking the condition of the blood serum as an index to the state of the body as a whole, it is not necessary that a phase of lowered immunity should precede every immunizing reaction, and on the other hand a negative phase is not always followed by a reaction. We must recognize that the site chosen for inoculation has a considerable influence on the type of response obtained. It must not be expected, however, that this separation of effects is to be so easily demonstrated in the case of every antigen that may be chosen for experiment; it will depend, as a necessary condition, upon the localization of the material at the site of inoculation, and this must, of course, be influenced by its solubility and diffusibility as well as by any selective affinity which it may exercise towards the tissues. Vaccines prepared from the pseudo-tubercle bacillus appear to be exceptionally favourable in these respects, so that the results obtained by the three methods of inoculation with which I have dealt are sharply differentiated. Now, this differentiation is what we aim at in the therapeutic use of vaccines. We wish to produce a reaction such as those I have just shown produced by subcutaneous inoculation, and characterized by a raised immunity with no preceding negative phase. But most of our vaccines are—in part, at least—readily absorbed, so that we run the risk of bringing on a negative phase, or even symptoms of intoxication. The readiest way out of the difficulty was to reduce the dose, and this was the measure actually adopted as soon as the opsonic method had provided a means of testing the effect of inoculations. After the injection of a small dose a larger proportion of the vaccine material was held at the site of inoculation and less was absorbed, so that it was found possible in practice to define a small range of doses in every case, which were effective and at the same time moderately safe.

One more consideration suggests itself on this point. If it is true that subcutaneous inoculation remains free from disadvantageous results, so long as the vaccine material is localized and is not absorbed into the circulation, then a vaccine which is only slowly absorbed has obvious advantages, and it may become possible to prepare such a vaccine of reduced solubility which will give us a wider range of safe dosage than we can command at present.

DISCUSSION.

Dr. A. BUTLER HARRIS (Loughton) emphasized the importance of the site of inoculation in the treatment of localized infections. In the case of tuberculous glands he found that quicker results were obtained by the introduction of minimal doses of tuberculin as near the site of infection as possible. He referred to the use of Berausch's tuberculin, which was used locally in progressively increasing doses with good effect. He had had a case of rapidly-spreading erysipelatous infection of the leg from a gnat-bite, the progress of which was completely arrested a few hours after the introduction of five million streptococcic vaccine into the infected area itself.

A REVIEW OF THE INOCULATION TREATMENT OF TUBERCULOSIS;

WITH SPECIAL REFERENCE TO LESIONS OF LYMPHATIC GLANDS.

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DURING the last five years the use of vaccines has attained to very wide application, and has made many converts. It remains, however, a new method, and while the more conservative of our profession are aware of reports of isolated cases successfully treated, they regard vaccine therapy as being still in an experimental stage and hesitate to employ a method of which, as they say, they know so little. A sufficiently large number of cases of tuberculosis have now passed through the therapeutic inoculation department at St. Mary's Hospital to enable a fair estimate to be made of the general utility of inoculation in the treatment of this infection, and I have obtained permission to use its records for the purpose of a critical review. I have taken

no part in the treatment of any of the patients, but I have been familiar with many of the cases, and I have made clinical examinations of a number of them either at the outset or during the course of their treatment.

In this paper the different sites of tuberculous infection, such as the lymphatic glands, the skin, or the genito-urinary tract, are considered separately, and inquiry is made as to which varieties do best, and as to circumstances which influence treatment for good or ill. The object is to enable one to say from past results what reasonable prospect there is of success in any given case. It is, in fact, an attempt to establish prognosis. No effort is made to advocate vaccine therapy as against any other method of treatment, as for this purpose a parallel series of cases treated by the alternative method would be necessary, and these are not available. Notice is taken only of actual clinical results, and the opsonic index is given a well-deserved rest.

The total number of cases of tuberculous disease treated in the department is 367. They all attended as out-patients, and though they included more well-to-do persons than usual in such practice, there was a large preponderance of the very poor. Out-patient treatment is not an ideal method at any time, involving as it does irregularity of attendance and absence of control over the patients' conditions of life, which are so often vitiated by the combination of ignorance and lack of necessaries comprised in the term poverty. Out-patient records, too, are necessarily imperfect, more especially with regard to results, since patients generally cease to attend at their own discretion without being formally discharged. On the former grounds, any method which achieves good results in out-patient practice deserves very full credit.

The numbers of each kind of case treated are as follows:—Lymphatic glands 155, joints 70, ulcer, sinus and abscess 50, genito-urinary tract 34, lupus 23, lungs and pleura 10, bone 8, dactylitis 7, peritonitis 5, eye 3, and larynx 2. Joints are discussed elsewhere at the present meeting, and will not be further considered here. Lymphatic glands, it will be observed, supply by far the most numerous cases, and these are considered in greater detail. Every patient treated for glands has been written to, and 87 of them have been personally interviewed, and the estimates of results are made from the cases thus examined. The estimates of results in other sites are taken from the records only, which are, I believe, sufficiently accurate, but less full.

Lymphatic Glands.

To consider, then, the cases of tuberculous lymphatic glands. In 8 of the 87 cases, inoculation was employed as an adjunct to removal by operation, in every case with satisfactory result and with no recorded recurrence. There remain 79 cases in which inoculation has been the chief method of treatment. Of these 37 are males and 42 females. In 10 of the cases the affected glands were either in the axilla, arm, or groin; in all the rest they were in the neck.

The treatment of these patients has consisted in inoculating them subcutaneously with Koch's emulsion of tubercle bacilli, generally known as B.E. The doses are minimal at the outset, and are repeated at intervals of ten days, a dose not being increased till it has ceased to have a therapeutic effect. The minimal dose is usually $\frac{1}{1\,5\,0\,0\,0}$ or $\frac{1}{2\,0\,0\,0\,0}$ mg., the smaller dose being always used for children. The maximal dose for children under 5 is $\frac{1}{1\,0\,0\,0\,0}$, for older children and adults it rarely exceeds $\frac{1}{4\,0\,0\,0}$; in a few instances $\frac{1}{3\,0\,0\,0}$ has been used, and $\frac{1}{2\,0\,0\,0}$ is recorded. Secondary infections are treated with appropriate vaccines. In any case where fluid is detected in a gland it is drawn off by a syringe and needle. It is of great importance that sources of irritation, such as carious teeth, pediculi or aural discharge, should receive local treatment.

The results are classified in the following way: When glands have disappeared altogether, or have been reduced to a size not larger than cherry-stones, and then remain hard and do not vary in size, they are considered "cured." When there is marked diminution, but the glands are of larger size than the foregoing—say as large as raisins—they are considered "much better." When the reduction is slight only, they are called "better," and others are described as "unchanged," or "worse."

Of these 79 cases, 27 are cured, 22 are much better, 18 are better, 8 are unchanged, and 4 are worse. For purposes of comparison these results are collected in three groups. No. 1, described here as "good," includes those which have shown marked improvement — the cases which are "cured" and "much better"; No. 2, called "moderate," includes cases slightly improved—those classed as "better"; and No. 3, called "bad," includes those which have not improved—the "unchanged" and "worse." I have tried to find reasons for these variations in result, and have considered the age of the patients, the duration of the disease before treatment, the period of treatment, the presence of tubercle elsewhere, the presence of secondary infections, and the dose. The same variations of dose have been employed in every class; the different results cannot depend on this. Tuberculous lesions elsewhere as well as in the glands are rare in this series (only 12 in all), and these are evenly distributed; they do not much affect prognosis. Secondary infections also occur irregularly in the three grades. The duration of the disease before treatment was begun and the duration of treatment have both a slight relation to the results, the advantage being on the side of short duration and long treatment; but the difference is not sufficiently marked for either to be a potent cause.

The age incidence is as follows: In the first age period—namely, children up to 5 years of age—there are 8 cases, in the second 16, in the third 10, in the fourth 13, in the fifth 14, in the sixth 7. Over the age of 30 there are 11 cases.

The *proportion* of cases in each 5 year age period up to 30 years of age which have undergone the varying degrees of improvement is as follows: In the first period, there are 6 out of 8, or 75 per cent., *good;* 2, or 25 per cent., *moderate;* and none *bad.* In the second period, 5–10 years, there are 8 out of 16, or 50 per cent., *good;* 7, or 44 per cent., *moderate;* and 1, or 6 per cent., *bad.* Third period, 5 out of 10, or 50 per cent., *good;* 20 per cent. *moderate;* and 30 per cent. *bad.* Fourth period, 11 out of 13, or 84 per cent., *good;* 2, or 16 per cent., *bad.* Fifth period, 10 out of 14, or 70 per cent., *good;* 1, or 7 per cent., *moderate;* 3, or 23 per cent., *bad.* Sixth period, 3 out of 7, or 43 per cent., *good;* 43 per cent., *moderate;* and 1, or 13 per cent., *bad.*

The figures indicate clearly the important influence which age has upon results in this disease.

Immunization occurs satisfactorily in the first period; there is then a fall till after the age of puberty, after which there is a marked rise in resistance, which is well maintained for ten years. During the period from 10 to 15 not only is the curve of improvement low, but that of failure is higher than at any other time.

Before leaving the subject of tuberculous glands, reference should be made to that series of cases in which the glands have entirely disappeared under treatment. These cases are 11 in number; with 4 exceptions they were all between the ages of 18 and 23, 7 of them had had enlarged glands for less than a year, 5 for less than six months, and only 2 for more than a year. It would seem, then, that for complete recovery the most suitable cases are those occurring at about the age of 20, and coming under treatment early; such recovery occurs in a few months; in only 3 instances has treatment exceeded a year's duration. The method of aspirating fluid is a successful one; it was practised in 9 cases in this series, often more than once, and 4 times in the 11 cases of complete recovery. Relapse after attaining to some degree of improvement has occurred in 11 cases.

It should be made clear that these cases of glands were, on the whole, decidedly bad ones. An indication of this is the fact that of the 79 cases, 43, or more than half, had been operated on previously, and 21, or one-quarter, had had more than one operation; 5 of them had had ten operations or more. Of the cases cured 9 out of 27 had been operated upon; of those much better, 14 out of 22; of those better, 11 out of 18; and 9 out of 12 of those unchanged or worse. If one may venture to suggest prognosis from these data, it would seem that in any 8 cases in which inoculation is adopted, with correct dosage, 5 will show marked improvement, of whom 2 or 3 will be cured, 2 will probably improve slightly, and 1 or 2 will fail. The best results are to be anticipated in young children and in young adults from 15 to 25, after which

they gradually deteriorate; the worst results occur between the ages of 10 and 15. Success will not be attained unless secondary infections are appropriately treated.

Ulcer, Sinus, and Abscess.

The second variety of tuberculous infection to be studied is a group in which are included ulcer, sinus, and abscess, 50 cases in all. The results show 10 cures, 20 much better, 9 better, 8 unchanged, and the rest doubtful. The age-incidence is distributed evenly throughout the first twenty-five years of life, after which there is a rapid fall. As in the case of glands, the degrees of improvement are arranged in three groups for comparison, and the proportion of these in each period of five years is as follows:

First period, 85 per cent. *good;* 15 per cent. *moderate;* and none *bad.* Second period, 70 per cent. *good;* 15 per cent. *moderate;* and 15 per cent. *bad.* Third period, 15 per cent. *good;* 35 per cent. *moderate;* and 50 per cent. *bad.* Fourth period, 85 per cent. *good;* 15 per cent. *moderate;* and none *bad.* Fifth period, 40 per cent. *good;* 20 per cent. *moderate;* and 40 per cent. *bad.* Sixth period, 63 per cent. *good;* 13 per cent. *moderate;* and 13 per cent. *bad.*

Here, again, the lack of resistance at puberty is very evident, for during this period not only is success lowest, but failure is highest, and the unsatisfactory result of "better" is also at its highest.

The dose employed among cases cured has averaged $\frac{1}{15000}$ mg. minimum and $\frac{1}{7000}$ mg. maximum for children, and $\frac{1}{15000}$ minimum to $\frac{1}{5000}$ maximum for adults. Secondary infections, chiefly staphylococcus, are common: they occurred in 28, or more than half the cases, but if treated they do not militate against good results. The duration before treatment began has frequently been long, 3 of the cured cases were of four years' duration. For cure, treatment requires to be long continued, the shortest period leading to cure lasted eight months, and 4 lasted more than a year. In the treatment of tuberculous ulceration great improvement may be looked for in 3 cases out of 5, the best results will be attained in young children and young adults, the worst in older children from 10 to 15. Treatment will probably last a year, and secondary infections will require attention in more than half the cases. Relapse has occurred in 6 of this series.

Genito-Urinary Tract.

Thirty-four cases of tuberculous disease of the genito-urinary tract have been treated, 9 of the testis, 8 of the kidney, and 17 of the bladder. The age of incidence is higher than in the case of glands or ulcer, nearly all cases occurring between 20 and 40, and being evenly distributed through that period. Of the testis cases 3 are cured, 2 much better, 2 better, and the rest doubtful. Of the kidneys 2 are cured, 2 much better, 3 better, and 1 dead. The death occurred after childbirth, and at a time when the renal symptoms were improving.

Of the cystitis cases 2 are cured, 4 much better, 8 better—that is, have had some relief of either their pain or their frequency of micturition—1 is no better, 1 worse, and 1 unknown. Relapse has occurred in 5 cases. Secondary infections, chiefly by the *Bacillus coli*, have been treated in 13 cases.

The dose should be a very small one at the outset; in 10 out of 15 of the successful cases the initial dose has been less than $\frac{1}{15000}$ mg, often $\frac{1}{25000}$; it may in time be brought as high as $\frac{1}{1000}$, but very bad results may follow excessive initial doses. Treatment in the successful cases has averaged one year and two months, though 5 cases have been treated for six months or less. In tuberculous disease of the genito-urinary tract great improvement may be anticipated in 3 cases of 7, and slight improvement in 2 more. The initial dose should not exceed $\frac{1}{25000}$ mg., and treatment will probably last a year. Secondary infections occur in about half the cases.

Lupus.

Lupus has been treated in 23 cases, chiefly between the ages of 15 and 25, under 15 years cases have been rare. It should be stated that great difference of opinion exists in the department as to the degree of improvement which certain of these patients have undergone. But, fools and angels notwithstanding, I prefer to leave this estimate for the present as, at any rate, an attempt at prognosis. Three cases are cured—this is agreed, 8 much better, 9 better, 1 unchanged, and 2 unknown. The doses employed are large; of the successful cases only 3 began with $\frac{1}{15000}$ mg. or less, and the average minimum is $\frac{1}{30000}$. Maximal doses vary between $\frac{1}{20000}$ and $\frac{1}{5000}$. Secondary infections are common, and often multiple; they occurred in half this series. Treatment has averaged nearly two years in the successful cases, and relapse has occurred five times.

Other Sites.

The other forms of tuberculosis treated may be briefly referred to: Of 10 cases of phthisis or pleurisy, 4 are reported cured or much better, 4 are unchanged. The dose is very small; $\frac{1}{25000}$ to $\frac{1}{50000}$ mg. is the initial dose. Of 8 cases of bone disease, 2 are cured and 3 much better; the dose is the same as in cases of adenitis. Of 7 cases of dactylitis, 2 are cured, 2 better, and 1 unchanged. One case of peritonitis is cured, 2 are better, and 1 unchanged. Three cases of ocular tuberculosis in the cornea, choroid, and retina respectively are all described as much better. Both cases of laryngitis are unchanged. Of the various forms of tuberculosis of which we have sufficient experience to form an opinion, it appears that tuberculosis of lymphatic glands is the form most amenable to inoculation treatment, nearly 1 in 3 being cured, and (including cures) 5 in 8 much improved. Next comes ulcer, with 1 in 5 cured and 3 in 5 much improved. In the genito-urinary tract 1 in 5 are cured and 3 in 7 much improved, and in lupus 1 in 8 are cured and 1 in 2 much improved. With such results obtained among out-patients it may fairly be claimed that inoculation has proved its value as a remedy for this scourge.

BACTERIOLOGY AND VACCINE TREATMENT OF ACNE VULGARIS.

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WHEN dealing with acne vulgaris, one has to be very careful to distinguish from it the other diseases to which the name "acne" has been applied, and especially not to confuse it with acne rosacea. It may seem rather absurd to mention this, but I have very frequently been called on to treat rosacea cases in which there was a certain amount of pustulation, they having been sent as true cases of acne vulgaris.

Acne vulgaris may be said to occur in four stages. First, there is the greasy skin, from which can be squeezed-out plugs of sebum; then there is the stage of comedo formation followed by the indurated stage, when, as the result of mild inflammation, the nodules become markedly indurated, while, lastly, there is the pustular stage. If these various stages are examined bacteriologically they will be seen to vary somewhat. The seborrhoeic plugs of the early stages show a mass of sebaceous débris, and myriads of small Gram-staining bacilli which I shall refer to as the acne bacilli. The comedo differs in the superficial and the deep parts to some extent, the deep parts showing enormous numbers of the acne bacilli to the exclusion of everything else, while in the superficial parts are to be seen as a rule a fair number of staphylococci, and in some cases a large number of those peculiar organisms—the bottle bacilli. The indurated nodules show the same organisms as the comedo as they are merely a further stage in the same process. In these nodules there is a small central bead of pus surrounded by a very thick layer of inflammatory tissue, and in the pus many of these bacilli are to be seen taken up by the phagocytes. The pustules may be divided into three varieties: First, there are the small, very superficial pustules which are of very rapid origin, and which in most cases show very many acne bacilli without any other organisms being present; secondly, there is the very indolent pustule which takes a very long time to form and which does not show the common white head till a late stage, when it has been infected with pyogenic cocci. This will show not true pus but broken-down tissue and sebaceous matter, with clumps of bacilli scattered about. The third variety of pustule is the acutely inflamed, painful, and tender, and is to be seen especially where there has been some friction on some previously-existing acne lesion. This last is due to a secondary infection with staphylococci.

When cultivating the acne bacillus one must always plant out the pus *en masse* on the media, as if one spreads it out even on the most favourable media, it has such feeble powers of vitality that it will not grow.

The acne bacillus is a Gram-staining organism, which, when seen in pus films, is arranged very irregularly and is frequently to be seen inside the polynuclear cells. In pus films it is not, however, so firmly Gram-positive as it is when it is seen in a film from a comedo where it is in general shorter and stouter than when seen in pus. This possibly indicates a certain amount of degeneration in the bacillus in the pustule. It may be found alone or it may be found in conjunction with staphylococci; both of these organisms may indeed be found inside the same pus cell.

The bacillus grows well in ordinary broth and on agar which has been rendered faintly acid either with acetic or hydrochloric acid. The best medium I have found for the bacillus has been, however, ordinary agar to which has been added 1 to 5 per cent. of oleic acid. The medium thus made is cloudy but it yields a much more vigorous growth than any of the others I have tried. After subculture on one of these various media for some time the bacillus will grow on ordinary agar, but only on one occasion was I able to obtain any growth of it on ordinary agar direct from the lesion.

The colony is white and raised rather more than staphylococcus from the surface of the medium and in very old cultures the edges become crenated and there is considerable heaping up of the colony; if glycerine is present in the medium then the old colonies will acquire a very distinct dark brown hue.

There is thus no doubt of the presence of a bacillus in these lesions of acne vulgaris which is difficult of growth and which is often but not always associated with staphylococci; the question which remains to be answered is: What is the rôle of this organism in the production of the lesions? The same bacillus is to be seen in the sebaceous matter which one can squeeze out from almost any person's skin, and it is almost always present in seborrhoeic conditions of the scalp and in oily seborrhoea of the body. Unna, who first described the organism but who did not obtain cultures, maintained from histological reasons that it might be the cause of all the lesions of acne. Sabouraud, who described the bacillus later in full detail, put it down as the causative agent in oily seborrhoea, and positively stated that acne was a condition superadded on a seborrhoeic foundation, and was due to pyogenic cocci. Gilchrist, some years later, redescribed the bacillus and ascribed to it all the lesions of acne. Whitfield, who has done most work in this connexion in England, states that while it is the pathogenic agent in the formation of the comedo it is not able to cause the pustulation which is so characteristic of the later stages. In an earlier communication I adduced evidence to show that the bacillus was capable of causing all the lesions of acne vulgaris. One of the cases which quite convinced me of the pyogenic nature of the bacillus in certain cases was a man who suffered from pustular acne of the back and shoulders, and from whom I obtained films time after time without seeing any cocci, and from whose pustules I obtained on five occasions out of eight pure cultures of the acne bacillus, while of these eight cultures only one grew staphylococci, the remaining two being sterile. This person had been treated for over two years with staphylococcus vaccine without any perceptible result, but within three months of his having a vaccine of the bacillus the pustulation had practically disappeared.

The details of the experiments on which I based my conclusion that the acne bacillus was a pyogenic agent in some cases I have already published, so I need not here describe them, but there seems no doubt that in some of the cases of acne the pustulation, or an aggravation of the pustulation, is due to pyogenic cocci. It is possible, however, that an organism which is to be found exerting little pathogenic action in most people, although present in considerable quantities, may yet, owing to some diminution in the resistance of the host, exert some more powerful influence, and I contend that such is very well illustrated in the case of the acne bacillus. Thus it is to be found in the sebaceous matter of some people in whom it apparently causes no discomfort. Others, again, whom we may suppose to be in some way less resistant to its action, show, as the result of its presence, an oily seborrhoea; others will show marked comedo formation, while some, in whom possibly the resistance is still further reduced, will react to the infection in the shape of pustulation. What the ultimate cause of the reduction in the resistance is we do not know, but it is probably, as many authorities have suggested, some form of toxaemia, but until we know something of the nature of this we must, I think, regard it as being an infection with a specific microbe, the acne bacillus, sometimes pure, sometimes mixed with other organisms, and treat it as such.

This brings us to the treatment of acne by means of vaccines. Early in the history of vaccine therapy cases of acne were published by Sir Almroth Wright and others in which the pustulation had been alleviated in a remarkable manner by means of staphylococcus vaccine. These first cases were probably, as such experimental cases are apt to be, not typical but exceedingly aggravated cases of acne of very old standing which had resisted all treatment for years. In such cases one would expect, and the expectation is borne out when one examines such cases bacteriologically, that staphylococcal infection plays a larger part than in the milder cases.

When one treats an ordinary case of acne with staphylococcus vaccine alone, one finds that some cases are not affected by it one way or the other; more commonly the case improves up to a point beyond which it will not go, however one modifies the dose. When, however, one combines with the staphylococcus vaccine a small dose of a vaccine made from the acne bacillus the beneficial effect is to be seen much sooner and it is much more complete.

There may be some difference of opinion as to whether the acne bacillus is the cause of pustulation, but there is no doubt that in the stages of the disease up to the formation of the comedo it plays the chief part. Thus, whether I am right or not in saying that it may cause all the lesions, the proper treatment, provided one is going to use vaccines, is to use a vaccine of the acne bacillus, which we know is the primary infection, combining it with staphylococcus vaccine in those cases where as the result of bacteriological examination we find that this organism is present in sufficient numbers to exercise its pathogenic effect.

As regards the dosage of the vaccines, I find that of the acne bacillus one gets best results with doses ranging from 5 to 10 million organisms. If larger doses be given, then a few days after there is an exacerbation of the pustulation indicating the occurrence of negative phase, and in one or two cases where I gave very large doses this negative phase was very marked and prolonged. The dose of staphylococcus that may be given with safety is comparatively large, about 200 to 500 million, although here again the exhibition of too large doses will have a deleterious effect. The inoculations should be repeated about once a week, although in some cases I think that they might be given more frequently, about every five days.

The results we have obtained in the inoculation department of St. Mary's Hospital since we started using the vaccine of the acne bacillus (usually in combination with staphylococcus) are far in advance of what we had been accustomed to when using the staphylococcus vaccine alone.

THE BACTERIOLOGY OF COMMON COLDS.*

By C. H. BENHAM, M.D., M.R.C.P.Lond.,
Hove.

COMMON colds are not only a source of great inconvenience to nearly all the inhabitants of these islands, and of annoyance to the general practitioner who is called upon occasionally to treat them, but they lay the foundations for many of the graver respiratory diseases which are such an important item in the death-rate. No really satisfactory classification being possible in the present state of our knowledge, I have used the term "common cold" to imply generally any mild catarrhal disorder of the upper air passages. But I do not wish it to be undetstood that a common cold is a clinical entity, any more than "jaundice" or "asthma." Common colds exhibit a very

* This paper was illustrated by lantern slides, which it has not been convenient to reproduce.

great variety of types, some mild and purely local, others severe, and occasioning profound symptoms of general disturbance.

The micro-organisms which naturally inhabit the nasal cavities and throats of healthy individuals are legion, and it is a problem of no small difficulty to unravel the labyrinth and to decide which of the many bacteria present are to be considered pathogenic. It seems quite probable that during the seasonal epidemics of catarrh quite a number of the common saprophytes found in the nasopharynx can acquire a certain degree of virulence, and therefore the list I am giving you may have to be increased as our knowledge of the subject grows. A considerable weight of evidence is accumulating with regard to the first four organisms which I shall mention. They are *M. catarrhalis*, *M. paratetragenus*, *B. septus* (*B. coryzae segmentosus*, Cautley), *B. friedländer*, and probably *B. influenzae* and the pneumococcus.

The *Micrococcus catarrhalis* is well established as a cause of common colds, and also of much more serious conditions, such as influenza, bronchitis, and pneumonia. In Kolle and Wassermann's[1] *Pathologenen Mikroorganismen* there is an article by Neisser giving a considerable list of observers who have recorded its occurrence both in normal throats and noses and in various pathological conditions. Dr. M. H. Gordon[2] examined a number of cases occurring in an epidemic simulating influenza which broke out in Hertfordshire in 1904–5, many cases of which were fatal with pyrexia, pneumonia, and symptoms simulating meningitis. Dr. Allen[3] has found it in both acute and chronic colds, and has drawn attention to the frequency with which it causes a very irritable cough, with scanty, very viscid expectoration from the pharynx.

My own observations entirely confirm this, and I have seen cases caused by the *M. catarrhalis* in which the cough has been so violent as almost to suggest a paroxysm of whooping-cough. As for its morphology,

it is a large coccus occurring in pairs. It is negative to Gram's stain, and being frequently found in leucocytes is not unlike the gonococcus. It is, however, rather more rounded in shape, and is readily distinguished by its cultures. Its colonies are whitish-yellow and opaque, and attain a considerable size. They are raised from the medium, to which they adhere very firmly. It grows best on blood-agar or nasgar, but a good virulent strain can be readily subcultured in ordinary agar. It usually fails to grow on gelatin. In broth containing 1 per cent. of glucose, lactose, saccharose, maltose or mannite no acid reaction is produced in a week. This distinguishes it readily from the *M. paratetragenus*, from the gonococcus, and from all the staphylococci, which all produce acid in one or more of these media. Subcultures may be kept alive for some weeks on nasgar. In making a subculture it is necessary to remove a visible portion of a colony, the growth being so adherent that it is quite possible to touch a colony without removing any of it.

The *Micrococcus paratetragenus* has received little attention from British observers. Attention was first called to it by Bezançon and De Jong,[4] who found it very frequently in association with the *M. catarrhalis* during the mild catarrhal attacks occurring in Paris in the winter of 1904–5. Bezançon[5] has also found it in the blood in a case of fatal pulmonary gangrene, and I have found it in the pus from a very foul-smelling empyema. It has been very frequent in the epidemics I have observed during the last two winters, and it is a point of some interest that Brighton is very closely in touch with Paris, and two of my patients clearly became infected with it while on a visit there. I find it very common in pharyngeal cells, and masses of it can be seen in the sputum in many cases of phthisis and the pulmonary affections.

In respect of morphology, the *M. paratetragenus*

is a coccus of extremely variable size, as seen in the sputum. It consists of large, deeply staining tetrads, embedded in a mass of smaller tetrads, diplococci, and minute bacillary forms, which are feebly stained. The large elements are Gram-positive, but the smaller elements fail to take the stain. A capsule or zoogloea is often present. These characteristics appear to a lesser extent in the subcultures. The zoogloea is usually lost, but the characteristic variability in size of the cocci and the peculiarity of their staining reaction are usually very well marked.

These variations in morphology and staining distinguish it, according to Bezançon, from the ordinary *M. tetragenus* of the mouth, but I am not entirely convinced of this point myself. Colonies of *M. paratetragenus* may be readily obtained on ordinary agar in a very short time (eight to twelve hours). They are creamy-white, glistening, rounded, and tend to coalesce. They are softer and less adherent than colonies of *M. catarrhalis*. Acid is formed in all the carbohydrate media above mentioned under *M. catarrhalis*.

The *B. septus* has only, so far as I can ascertain, been described by British observers. As long ago as 1895 Cautley[6] recorded 8 cases of common cold, in 7 of which a diphtheroid bacillus was present which he named *B. coryzae segmentosus*. Of all the germs described as occurring in common colds this bacillus has least claim to be a cause of coryza, and I think those who have investigated it are now agreed that it causes rather a mild pharyngitis, with painful throat, muscular pains, and often severe nervous depression, but with no temperature and little or no nasal catarrh. I believe it to be a common cause of "stiff neck," "muscular rheumatism," and various transient muscular pains. Dr. Edmund Cautley did not pursue his investigation, or, at any rate, did not publish any further results, and in 1905, quite unaware that any work had been done on the subject, I rediscovered the germ, which was in danger of being forgotten. I then found that Dr. Prosser White,[7] of Wigan, had also been working on the subject, and in his book on catarrhal fevers you will find not only a very complete review of the evidence of the infective nature of common colds, but numerous experiments on Cautley's bacillus.

Morphologically considered the *B. septus*

is a diphtheroid bacillus. It is found both in the noses and throats of patients suffering from pharyngitis, but its most common situation is in the flat cells of the pharyngeal epithelium. Cultures can be readily obtained if the case is virulent. The best growth is on serum, but it grows well on agar or nasgar. The colonies are rounded, transparent, and finely granular, and do not usually attain a larger size than the head of a fair-sized pin. It is grown readily in broth, and produces acid in glucose, lactose, saccharose, and maltose. In this respect it resembles the diphtheria bacillus but differs from Hofmann's bacillus, and the *B. xerosis*. In cultures the bacillus appears first as a very short oval rod, almost like an oval coccus, but by the third day the typical appearance of the bacillus is shown. It is then a short bacillus with rounded ends, about 1·5 μ in length by 0·3 μ in breadth. The protoplasm of the ends of the bacillus stains deeply, but there is a band or septum of unstained protoplasm running across the middle of the bacillus. This, I think, indicates a line of division, and one frequently sees the appearance of a diplobacillus. Involution forms occur, clubs, and pear-shaped forms, but these are not so common as in the case of *B. diphtheriae*. No granules are shown by Neisser's stain. Gram's stain is positive.

The Bacillus of Friedländer has been demonstrated by R. W. Allen as occurring in many acute and chronic colds. He considers it to be a cause of very profuse coryza, and records an epidemic occurring in the laboratory at Guy's as the result of the spilling of a broth culture on the desk. All the workers in the laboratory had violent coryza, and the *B. friedländer* was recovered from their noses.

Pfeiffer's Bacillus and the Pneumococcus are probably present in some cases of mild catarrh. I have seen small bacilli resembling Pfeiffer's bacillus in a good many swabs, but only in small numbers, and I have not succeeded in isolating them. Pneumococci are also often present in swabs in small numbers, but I have not succeeded in getting them to grow in pure culture. Dr. Butler Harris has, however, told me of a case in which the pneumococcus was obtained from the throat of an asthmatic patient with what appeared to be a common cold, who some days later developed an attack of typical pneumonia.

Opsonic Work. — Common colds, which are usually a localized infection of the upper air passages, should, according to our President's theory, be amenable to treatment by vaccine therapy. That this is the case R. W. Allen's papers published in the *Lancet*, October, 1908, give ample evidence.

His work proves, I think, two main facts: (1) That the *B. septus*, *M. catarrhalis*, and the *B. friedländer* are all pathogenic in certain cases of common colds. (2) That patients infected with these germs can be successfully treated by vaccine therapy.

I am at present engaged in a series of observations of the opsonic index in cases of common cold, and my results tend to confirm those recorded by Allen, at any rate as far

as the *M. catarrhalis* is concerned. The following are cases in point:

CASE I.

The patient was a throat and ear specialist. Subject to acute colds, usually lasting three weeks. His existing cold was of less than twelve hours' duration when first seen.

There was dryness and tickling of left nostril, the nasal mucous membrane and pharynx were red and glazed. The *M. catarrhalis* was seen in the throat swabs, and 250 million of a stock vaccine prepared from another case were injected within twenty-four hours of the onset. On the third day the symptoms had completely aborted. A second dose on the eighth day was given, the patient feeling quite well at the time. A second acute attack, however, occurred five weeks later. I found both the *M. catarrhalis* and *M. paratetragenus*. An injection of 250 million was given twenty-eight hours after the onset. The patient had a rigor and a temperature of 104° F., and had to stay in bed all the next day. This cold, however, also cleared off rapidly, though not so thoroughly as the first. As he was feeling better and had some important engagements which made him unwilling to risk a severe negative phase I did not inject the autogenous vaccines which had been prepared.

CASE II.

The patient was a dispensing chemist, who had an acute attack with symptoms of influenza—sudden onset, severe headache, nervous prostration, backache, stiff neck. Temperature 103° F.

Autogenous vaccine of *M. catarrhalis* prepared. On sixth day the patient was better, and temperature normal in the morning, but on the seventh day it rose to 102.4° F. in the morning, and there was acute pain and feeling of tension in the right ear and an enlarged gland in the right anterior triangle; 250 million of the vaccine were injected on the seventh day, which was followed by a rapid rise in the opsonic index, accompanied by a fall in the temperature and disappearance of all pain in the ear and resolution of the glandular swelling. His convalescence was more rapid than usual.

CASE III.

This was a medical practitioner who has had winter cough for fifteen years, lasting from the first cold weather to the spring. Slight emphysema is present, and the patient has been advised to winter in Egypt. The existing attack began in October, 1908, with an acute cold, very irritable cough, and scanty viscid expectoration in the morning.

The *M. catarrhalis* and the *M. paratetragenus* were both isolated, and an autogenous vaccine made of *M. catarrhalis*. Subsequently a mixed vaccine was made from all the organisms found in a specimen of washed sputum. Treatment extended over three months. His chart shows a very definite negative phase following the first two injections, and then a rise. The patient rapidly lost his irritable cough, the expectoration became loose and easy, and there was no very severe attack all the winter. Mild naso-pharyngeal catarrh continued, and it is probable that the posterior ends of the middle turbinals will have to be removed before the patient is completely cured. But the results, so far as they go, are encouraging, having regard to the very chronic nature of the case.

In conclusion, I should like again to emphasize the importance of those slight deviations from the normal which are roughly described as common colds, believing that in studying them we have the key to the etiology of many of the graver respiratory diseases, and that if a rational prophylactic treatment on general and bacterio-therapeutic lines can be devised a very important step will have been taken.

I have to thank the Science Committee of the British Medical Association for grants of £2 and £10 towards the expenses of the research.

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DISCUSSION.

Dr. BUTLER HARRIS (Loughton) stated that he had tabulated the results of the investigation of 55 cases of infections of the throat and respiratory tracts. *Micrococcus catarrhalis* occurred in 33; *catarrhalis* and *septus* in 13; 9 of these cases were those of epidemic influenza. Out of 6 cases of acute throat, 4 showed *catarrhalis* only on the swabs. The tonsils were covered with a pseudo membrane. A vaccine of 100 million of *catarrhalis* was given in 3 cases with curative results within eight hours; 1 case had had a similar throat attack six months previously which was not treated by inoculation, and which lasted six days. He was attempting to establish a clinical picture of the various infecting organisms of the mouth and throat or their groups.

Dr. BENHAM, in reply to questions put to him, said he considered the *B. septus* to be quite distinct from the diphtheria bacillus, from the pseudo-diphtheria bacillus, from Hofmann's bacillus, and from *B. xerosis*. Dr. Mervyn H. Gordon had put the reasons for differentiating these organisms very fully in his report to the Medical Officer of Health to the Local Government Board, 1901-2. With regard to the dosage, he quite agreed with Dr. Butler Harris that the best doses had yet to be ascertained.

SECTION OF PHARMACOLOGY AND THERAPEUTICS.

Professor RALPH STOCKMAN, M.D., F.R.C.P.Edin., President.

PRESIDENT'S OPENING REMARKS.

THE PRESIDENT, in opening the work of the Section, limited himself to the extending of a welcome to all present, whom he reminded that it was in Belfast twenty-five years ago that the Section had come into being, and that its inauguration was due to the energy of the present President of the British Medical Association, Sir William Whitla.

DISCUSSION ON THE TREATMENT OF OEDEMA.

OPENING PAPER.

By H. D. ROLLESTON, M.A., M.D.Cantab., F.R.C.P.Lond.
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CONSIDERATION of the pathological problems concerned in the causation of oedema would be out of place here, but since oedema is, like purpura, a manifestation of several distinct conditions, the different forms of oedema must be mentioned as a preliminary to considering their appropriate treatment.

1. The oedema of venous obstruction and cardiac disease is primarily mechanical and due to hydrostatic factors, as is partly shown by the influence of gravity, hydraemia and malnutrition of the capillary endothelium being active agents in the production of oedema.

2. Renal dropsy, though in some instances mainly cardiac, as in granular kidney, is in its proper sense of complex pathology; toxic factors are probably predominant, but hydraemia and retention of chlorides must also be taken into consideration. Indeed, it is probable that oedema of renal disease should be regarded as due to different factors, or combinations of factors, in different cases.

3. Toxic oedemas other than those due to manifest renal disease; for example, the universal oedema sometimes seen in infective diarrhoea in children, and the critical oedema seen in rare instances of pernicious anaemia.

4. Inflammatory oedema.

5. Oedema due to thrombo-phlebitis, depending on combined venous and lymphatic obstruction.

6. Oedema due to lymphatic obstruction.

7. Oedema due to nervous factors: (*a*) oedema associated with peripheral neuritis, beri-beri; (*b*) hysterical oedema.

8. Oedema of doubtful origin; for example, chronic trophoedema (Milroy's disease).

The remarks on treatment will be almost entirely confined to cardiac and renal oedema.

I.—CARDIAC DROPSY.

If it be assumed that this is primarily mechanical and that the change in the capillary wall which allows the increased transudation is due to malnutrition and not to toxaemia, the problem of rational treatment is easier to solve than in cases in which a toxic factor is active. It must be admitted, however, that the problem is not so simple in all cases of cardiac dropsy, and that from intestinal toxaemia or renal insufficiency a toxic factor may be superadded.

The mechanical breakdown is primarily met by rest and digitalis; and, as Professor Dixon has shown that the tincture may be devoid of any active principle, it is important to be certain that we are using a physiologically active sample, such as the fluid extract prepared and tested by Parke, Davis and Co., which is eight times stronger than the official preparation. Nativelle's granules are often successful; the combination of digitalis and caffeine, as advised by Sir James Barr, often acts well, as does a similar combination of theocin or diuretin with digitalis. The irritating properties of theocin on the stomach must be borne in mind, for vomiting in advanced mitral disease is in my experience a very bad prognostic. Theocin acetate appears to be better borne. Baillie's pill, called by Addison *the* pill, and sometimes spoken of as Addison's or Guy's pill (1 grain each of digitalis leaves, squill, and blue pill), has a deserved reputation.

To obviate hydraemia and to diminish the work of the heart, restricted fluid—the amount in the twenty-four hours being 25 to 30 oz.—is an important part of the treatment. It is better to restrict the intake than to remove the excess of fluid by purgatives, a process which to some extent necessarily interferes with nutrition. The restriction of fluid should be gradual and progressive, so as to avoid the discomfort and bad effects of thirst and constipation. The amount of salt should also be restricted. Gentle massage may be useful in cases with moderate oedema, and probably acts in several ways, by improving the nutrition of the tissues as well as by shifting the oedema fluid. The abstraction of fluid by means of hot-air and other baths does not appear to be of anything like the same value in cardiac oedema as it is in renal dropsy. The influence of gravity in preventing oedema is much more in evidence in cardiac than in renal dropsy. Puncture of the legs and drainage may be necessary in some instances, but its use is not dictated by the same argument—namely, the removal of toxins—as in the case of renal dropsy. In cases with chronic polyserositis repeated tapping of the abdomen or pleurae may be necessary, and at the end of the paracentesis adrenalin may be injected into the serous cavity (Barr).

II.—RENAL DROPSY.

The complicated etiology of the oedema and the variations in the excretory capacity of the damaged kidney make treatment much more problematic and its effects more difficult to estimate with accuracy than in cardiac dropsy. There are, therefore, difficulties in any given case in choosing the proper remedy to employ, and it must be borne in mind that sudden improvement may be independent of the treatment employed. To illustrate the occurrence of "urinary crises" and their relation to treatment, three cases may be quoted. A man with chronic tubal nephritis and general oedema had had almost every form of recognized treatment without any response, when suddenly profuse diuresis and diaphoresis set in, and in four days he lost all his oedema and 4 st. 3 lb. in weight; at the time of this urinary crisis he was not on any special form of treatment.[1] Another patient, with chronic nephritis and universal dropsy, was put on caffeine citrate, and in sixteen days lost all his dropsy and 4½ st. in weight.[2] The urinary crisis was naturally put down to the caffeine, but in view of the failure of caffeine in other apparently similar cases and of the occurrence of an even more signal urinary crisis in the case quoted above, the question must arise whether the profuse diuresis was due to or independent of the caffeine. In a small boy, with chronic tubal nephritis and universal oedema, the scrotum became so excoriated that he was put into a hip bath, and after this the oedema rapidly disappeared—an event which was almost certainly due to some factor other than the bath. It may also be mentioned that the famous Dr. Samuel Johnson had a urinary crisis, of 20 pints of urine in the twenty-four hours, after taking an infusion of broom.

As in most obstinate diseases, there are many remedies for renal dropsy; the problem is to find indications for the appropriate remedy in each case. The reduction of dropsy in renal disease is very largely the treatment of a symptom, and it is obvious that the dropsy may be removed, by incising the legs, for example, without any benefit to the underlying renal disease. In the second place, the extremely rapid absorption into the circulation of a large amount of oedema fluid is a possible cause of danger, for toxic matters contained in the fluid may act on the nervous tissues and induce uraemic symptoms; further, it is conceivable that the occurrence of dropsy in renal disease is a conservative process in so far that toxic bodies which the kidneys cannot eliminate are excreted into the tissue spaces, and thus prevented from causing uraemic manifestations. There are therefore cases in which treatment directed to remove dropsy may do harm rather than good; probably this holds good in acute nephritis.

In considering the treatment of renal dropsy it will be simplest to recite the means at our disposal for combating the factors concerned in the causation of the oedema.

(*a*) *Means of Diminishing Toxaemia.*—The poisons may be (1) in the circulation as the result of their diminished excretion by the kidneys; (2) in the tissue spaces and so outside of the circulation, there having been excessive metabolism due to absence of the restraining influence of an internal renal secretion (Bainbridge); or (3) in both these situations.

The presence of toxins in the circulation damages the walls of the capillaries, and so leads to increased transudation of fluid. Removal of these toxins may be attempted by free drinking, so as to wash them out of the body; or the copious fluid regimen, especially milk, may be combined with purgation. This plan may succeed when the kidneys are able to deal with the increased amount of fluid; but if they are not capable of this, hydraemia results, and the retained toxins are not radically diminished. Copious water drinking, which may be successful in some cases of chronic nephritis, should, as von Noorden insists, be avoided in acute or subacute nephritis—conditions in which the kidneys require as much rest as can be obtained with safety to the rest of the body. Purgation alone will tend to prevent increased toxaemia from intestinal sources, and to favour excretion of toxins from the intestinal vessels. The use of diuretics in the treatment of oedema requires care, for the kidneys may not be in a position to respond to the call for increased activity, and, further, the diuretic drugs may irritate the kidneys. Diuretics, though not debarred, must be employed in selected cases in which there is no evidence of acute or recent subacute nephritis, and the effects must be carefully watched. The list of diuretics available is long, and it would be tedious to repeat them all. Caffeine, it seems to be generally agreed, should be given in small doses and for short periods only; I have, on the whole, found it more successful than diuretin, and I also prefer it to theocin. Diuretic drugs are probably more successful in removing dropsy in patients with renal disease in whom the occurrence of the oedema depends on the heart rather than on renal toxaemia. It is probably in such cases that digitalis and Baillie's pill act successfully.

Hot-air, vapour, and hot-water baths diminish hydraemia by increasing the perspiration, and, it has often been assumed, lead to some vicarious excretion of toxins. The main basis for the belief that poisons are excreted by the skin is that in extremely rare instances an efflorescence of urea has been seen on the skin of uraemic patients. Von Noorden, who has not been able to detect more than traces of urea in the perspiration of renal cases, considers that the good effect of sweating in renal disease is due to diminution of the fluid contents of the blood, and that this can be effected more satisfactorily by restricting the intake of fluid by the mouth. I have often compared the results of hot-air baths and of restricted fluid, and it appears to me that renal patients feel much better after the baths than they do as a result of a restricted fluid intake, thus suggesting that in some way perspiration diminishes toxaemia.

Removal of toxic substances from the tissue spaces might conceivably be effected by diaphoresis, but of the efficacy of this there is no satisfactory proof. Probably the most satisfactory method of removing toxins and salts from the tissue spaces is the old-fashioned one of incising the legs and obtaining free drainage. In this way the tissues are washed out, and the oedema fluid, and the bodies which attracted the fluid out of the vessels by osmosis, are removed together. When the legs have been punctured the fluid intake, if previously restricted, may, I think, be safely increased. Massage to the legs is useful in increasing drainage. As this plan of puncturing the legs is perhaps sometimes regarded as a mainly mechanical

[1] Rolleston and Golla, BRITISH MEDICAL JOURNAL, 1909, i, 330.
[2] Rolleston and Attlee, *Lancet*, 1905, ii, 1394.

and therefore temporary means of relieving oedema, it is important to insist on the possibility of its action in reducing the toxin-content of the tissue spaces. With regard to the actual procedure the legs may be incised, a cut being made on the dorsum of the feet in their long axes, a number of small pricks may be made in the skin, or Southey's tubes may be inserted under the skin. Probably the best method is a single incision on the dorsum of each foot; it is rather more of an operation than a number of small pricks from the point of the knife, but my experience is that with a number of small punctures there is more risk of infection of the skin.

(*b*) *Means of Avoiding Hydraemia.*—This may be effected by restricting the amount of fluid taken, by increasing the excretion by the skin, and by the intestines and by diuresis.

The obvious method of restricting the fluid taken by a dropsical patient is still a matter for debate; and just as the strict diet formerly employed in grave or composite cases of diabetes has been relaxed on account of its bad results, so with regard to the plan of restricting fluid in renal dropsy it has been thought that it may be a source of danger (Strauss). In the oedema of acute nephritis restricted fluid appears to be the most satisfactory treatment, for it economizes the labour of the kidneys in the matter of excreting water, and so enables them to rest and recover. With regard to the oedema of chronic nephritis we must recognize the very considerable differences manifested by different patients. In some the kidneys are incapable of dealing with more than a restricted amount of fluid, whereas in others the kidneys show an ability to deal with an increased ingestion of fluid hardly below that of the healthy organs, and yet there is oedema. In the first group restricted fluid may be desirable to prevent hydraemia, but in the second group a restricted fluid regimen is unnecessary. Each case must therefore be treated on its own merits, and no hard-and-fast rule can be laid down as to the advisability of restricting the fluid intake.

The removal of fluid from the skin by means of free perspiration induced by hot-air, vapour, or hot-water baths is of some value, and there is room for doubt whether von Noorden's opinion—that it is simpler to curtail the amount of fluid taken by the mouth—is justified in practice. Removal of fluid from the subcutaneous tissues by incising the skin and allowing free drainage has been referred to as a means of reducing the local toxic accumulation in the tissue spaces. Its purely mechanical effect in the removal of fluid is undoubted. With regard to removing fluid by saline and mercurial purgatives, it is important not to deplete the patient very freely, otherwise absorption of food will be interfered with and general nutrition will suffer. The question of diuretics has already been referred to.

(*c*) *Diminishing the Permeability of the Walls of the Capillaries.*—Since oedema depends to a considerable extent on increased permeability of the walls of the vessels, it might conceivably be obviated by diminishing this condition. It is obvious that this can most logically be effected by removing the causes—especially toxaemia—of this change in the vessel walls; this has already been considered. Even if it were possible by the action of some drug, such as the salts of calcium, it is doubtful if it would be advisable to render the walls of the vessels in the subcutaneous tissues less permeable, for the drug might also render the vessels in the glomerular tufts of the kidney less permeable and so interfere with renal excretion.

(*d*) *The Restriction of Chlorides.*—That chlorides may be retained in cases of parenchymatous nephritis with dropsy is undoubted, but it is not proved that in all cases the relation of cause and effect is the same. Whilst in some instances the damaged kidneys are unable to excrete sodium chloride, which therefore accumulates in the tissues, and as the result of osmosis is responsible for the oedema, in others the chloride retention is caused by the dropsy. In cases of the first category a salt-free diet is clearly indicated, and is often most successful in diminishing and controlling the oedema. The good effect of some drugs, such as caffeine, theocin, diuretin, on dropsy has been ascribed to the increased percentage of sodium chloride found in the urine. It must, however, be clearly recognized that a salt-free diet is often disappointing, and that this may be because the salt retention is the result, not the cause, of the dropsy.

To the treatment of the other forms of dropsy time will allow only the briefest reference. Bryant's extremely interesting case of dropsy in an otherwise normal man who took large quantities of salt, and became free from dropsy after this indulgence was curtailed, proves that in some instances sodium chloride is a most important factor. Most toxic oedemas other than those of renal origin subside with the amelioration of the underlying condition, and are seldom of such duration and degree as to call for special treatment. In some of these cases calcium salts, preferably lactate and not the chloride, may be tried. For dropsy due to lymphatic obstruction Mr. Handley's operation of lymphangioplasty is on trial.

DISCUSSION.

Sir JAMES BARR (Liverpool) said that he still adhered to the classification of dropsies which he adopted in 1886. 1. Those cases in which there was an abnormal transudation from the capillaries without apparent obstruction in the absorbents (as occurs in inflammations, in vasomotor paralysis, in anaemia, in Bright's disease, etc.). 2. Those cases in which there was obstruction to the return current, whether local or general, such as the occlusion of a vein or lymphatic portal obstruction, or general venous obstruction from mitral or tricuspid regurgitation, or obstructive lung disease. He discussed in turn the part played by the three factors concerned in abnormal transudation, namely: (*a*) The condition of the capillary walls; (*b*) the condition of the blood; (*c*) the pressure within the capillaries. In dropsy due primarily to defective absorption there was also present, as a rule, increased transudation because of the over-pressure in the capillaries caused by the obstruction. The afferent capillaries and venules were the chief absorbents, and venous obstruction was therefore a more common cause of oedema than the occlusion of the lymphatics. In lymphatic obstruction with no venous obstruction and a high velocity in the capillary bed, there might be a certain amount of brawny oedema but the watery portion of the effusion was usually readily removed by the venules. The treatment of oedema was theoretically one of the simplest problems in medicine. All that was necessary was to remove the cause and to restore the balance between intake and output. It was in the removal of the cause that difficulty was at times experienced.

Dr. LAZARUS-BARLOW (London) felt that he needed to apologize for speaking, since it was fifteen years ago that he had made his experiments upon oedema, and from what he had heard that day the question appeared to be even more complicated than it was. He would confine himself to the question of the so-called mechanical oedema. Nothing was more certain than that pressure as such was unable to increase the outflow of fluid from the capillary blood vessels; indeed, since the skin might be regarded as a rigid wall in comparison with the walls of capillaries and lymphatics, it seemed to him that any increased capillary pressure would of necessity increase the pressure within the lymph spaces and lymphatics outside the capillaries. With regard to the changes in "permeability" of the capillary wall, which were said to account for variations in the amounts of fluid and their composition found in the tissue spaces, he remarked that an increased outflow of more highly albuminous lymph was said to be due to increased permeability of the capillary wall, while the only test for "increased permeability" was that same character of the lymph; it was a glaring instance of reasoning in a circle. After all, the *raison d'être* of blood, blood vessels, lymph and lymph vessels was the tissue elements, and he adhered to his original view that the fundamental causes of oedema were starvation and poisoning of the tissue cells. In respect of treatment he only wished to refer to Sampson Handley's operation of lymphangioplasty for oedema of the arm in carcinoma of the breast. Several cases had been thus treated at the Middlesex Hospital, some of them with marked relief, oedema disappearing, pain being relieved, and use of the fingers being regained. The operation was still on its trial.

Dr. F. J. CHARTERIS (Glasgow) briefly referred to the limited value of the so-called diuretic drugs in the treatment of renal oedema. Cases varied very much in character, and it was consequently difficult to come to general conclusions. The impression left in his mind

after going through a series of over 100 cases was that drug treatment was very unreliable. Diuretin was, on the whole, more reliable than caffeine in stimulating the kidneys in disease. Mercurials, even in comparatively small doses, seem to be very badly borne, and in most of the renal cases rapidly produced salivation. With regard to the use of Southey's tubes, he had found it of great value to disinfect the skin and then paint it over with zinc-ichthyol gelatin or some other impervious dressing and insert the tubes through this coating. This plan had proved of great value in preventing inflammation or erythema round the punctures.

Sir LAUDER BRUNTON (London) said that he had found benefit in cardiac cases from salt-free diet. He had repeated many years ago Ranvier's experiments on oedema. These showed that venous obstruction by ligature might not produce oedema, but it would do so in one leg if the sciatic was divided. If the motor roots of the sciatic were cut the oedema did not occur, but it did so if the vasomotor nerves were divided. The nervous element in oedema was well shown in some cases of angio-neurotic oedema. He had seen one case in which the whole of one side of the face swelled up in half an hour, so much that the right eye was almost closed, while the left half remained normal. He had once involuntarily produced acute oedema all over the body in a case of ulcerative endocarditis by the injection of antistreptococcic serum. Calmette had found that the addition of lecithin to cobra venom conferred on it a haemolytic power like that of viperine venom, and this suggested that possibly in the future we might be able to convert any toxin which produced oedema into one having a contrary action.

Dr. H. C. CAMERON (London) said that he thought that too little had been said in the discussion in praise of the treatment of oedema, whether cardiac or renal, by means of a salt-free diet. He was surprised that more emphasis had not been laid upon the necessity of accurately recording the body weight in these cases. He believed that the only way by which the success or failure of any line of treatment could be estimated was by making such a record. In certain cases of anasarca, though not in all, the curve of the body weight followed the curve representing the retention of sodium chloride in the body so exactly that the correspondence could not be due to coincidence. In these cases a diminution in the intake of salt, whether by a milk diet or by a salt-free diet, was followed by rapid decline of the anasarca. Diaphoresis was generally recognized as more effective than purgation in renal dropsy, and it was interesting to note that recent analysis had shown that while the sweat was rich in sodium chloride, the watery evacuations from the bowel contained only a trace of the salt.

Dr. W. C. SILLAR (Edinburgh) wished to draw special attention to the possible cause of some cases of oedema being the absorption of toxic substances from the intestine, and compared the action of certain poisons which appeared to cause injury to the tissues, and therefore allowed of permeation of fluids through them—for example, through the wall of the heart and of the blood vessels independent of the amount of pressure. The advantage gained by the clearing of the intestine, the efficacy of fasting and low diet in many cases, the occurrence of rapid absorption of calomel in many cases from the intestine, afforded additional evidence that in some of these cases the condition was caused by absorption of toxic products from the intestine; and it was obvious that in the treatment of the condition this possible cause must not be overlooked.

Dr. JOHN HADDON (Hawick) recommended a course of fasting as often curative in Bright's disease as well as in other conditions.

The PRESIDENT, in the absence of Dr. Rolleston, replied. He said that the difficulty of estimating the success of treatment was very great, because the pathological processes concerned were so different. Statistics were therefore to a great extent devoid of meaning. In some cases of temporary cardiac failure—in mitral regurgitation for example—the oedema was so transitory and so amenable to treatment, that the condition could hardly be due to any widely-spread toxaemia. Although calomel in small doses was of great service in the treatment of oedema, he agreed that the drug was badly borne by patients with renal insufficiency.

FACTS AND FANCIES IN PHARMACOLOGY.

By W. E. DIXON, M.A., M.D.,

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[ABSTRACT.]

IT cannot be doubted that the man who makes experiments and draws his deductions from them does more for the advancement of medicine than he who is content to make speculations as an interpretation of facts; yet many of our explanations of disease and the action of drugs have been formulated by members of the latter class, and hence it is not surprising that so many of our adopted maxims should be found to have no foundation in truth. All of us, unfortunately, have been brought up in a school of dogmatism, and taught to accept certain views and statements as proven, and such is the adherence to early teaching that for the most part we have received the current hypotheses without questioning the validity of the evidence upon which they are based. Dr. Hale White, in his address on medicine at the annual meeting in 1907, has given many examples of how explanations of the phenomena of disease which have no foundation in fact have been accepted and adopted by our profession.

It is, however, strictly with pharmacology that I now wish to deal, and desire first to point out how even in our teaching of this subject we still adhere to ancient precedent, laying special emphasis or even confining our whole time to that part of the subject the necessity and use for which has long since disappeared.

In the early days of medicine, in the absence of scientific knowledge, the preliminary medical subjects consisted largely of anatomy and materia medica. Both these subjects were taught at considerable length and with much minuteness, and still no undue burden was placed upon the student. With the rise of scientific knowledge the importance of these old subjects has diminished; but anatomy is still taught with a minuteness of detail quite out of proportion to the needs of the medical student, and there are even those who assert that this has not been improved during the last ten or twenty years by substituting for the surgeon as teacher the professional anatomist. And materia medica, using the term in its strict sense, is still taught by us, as in the past, often to the exclusion of really useful knowledge of the action of drugs. We no longer collect our own simples or prepare our galenicals; we have long since handed over this branch to the expert druggist and pharmacist, and yet we have not materially altered our teaching. Huxley, writing on medical education as long ago as 1870 said: "I must confess that if I had my way I should abolish materia medica altogether." Because we happen to use drugs, why should we be cognizant of their origin and mode of preparation any more than that of our stethoscope or clinical thermometer? It is with their use only that we are essentially concerned. To make the student of medicine commit to memory the heterogeneous mixtures in the *Pharmacopoeia*, many of which are unreasonable and have arisen by ignorance or misconception, to make him detail the various official preparations of drugs and their strength, generally by the aid of *memoria technica*, is a piece of stupidity unworthy of the age. These facts can be looked up when required in a few seconds in the same way as we look up a table of logarithms or time-table. The only part of the materia medica which I would retain for the student of medicine is such elementary chemistry of drugs as would enable him to understand the endless new synthetic bodies placed upon the market, so as to protect him as far as possible from the wholesale drug manufacturer.

Passing now from the influence of custom and tradition on the subjects taught under the title "Pharmacology" to the effects of these influences in other directions, we find the ancient association of our subject with astrology is still in evidence in the terms Mercury, Lunar caustic, and the like; Saturnine lotions and Martial tinctures, phrases of yesterday, are happily now extinct, but the sign ℞, the symbol of the planet Jupiter, still heads the orthodox prescription.

Many drugs have been credited with some virtue, which has been copied from book to book until the origin of its supposed action is lost. Opium was supposed to have value as a local anaesthetic, and the *Pharmacopoeia* contains a plaster, a liniment, and the ointment of galls and opium, all apparently for the purpose of a local effect; but

opium and its alkaloids have no local anaesthetic action. Opium was further contraindicated in cardiac and renal disease, although it has no action on either the heart or kidneys; it is excreted by the alimentary canal and induces constipation, and this may afford some reason against its employment in renal disease. Hydrocyanic acid is another drug largely prescribed as a local anaesthetic for the relief of gastric pain, although the amount of acid given is too small to have any of the local effects credited to it.

In the case of some other drugs, such as digitalis and lead, we have in recent times completely changed our view of their action. Thus, Neligan, in the third edition of his his book, 1851, states that digitalis is a sedative to the heart, that it diminishes the force and frequency of the pulse, and enfeebles the action of the heart; and, speaking of lead acetate, he says it is "employed with benefit in the treatment of disease where the indication is to lower the circulation." We now know from the work of experimental pharmacology that both digitalis and lead raise blood pressure and increase the tonus of the vessels and heart; our views as to their action have entirely changed. Unfortunately the same cannot yet be said of ether and strychnine. Both these drugs are still employed, on the supposition that they excite the heart to increased activity. The effect of ether is to depress nerve tissues; in very large doses it tends to depress muscle tissue, including cardiac muscle, but it never excites. Strychnine likewise has no direct stimulant action on the heart; by exciting the vasomotor centre it may slightly increase the cardiac activity indirectly, but it should never be put in the same category with digitalis, lead, or other cardiac drugs. In this class also I would place atropine and the plants owing their activity to it. These drugs have been employed, amongst other things, to stop the secretion of milk and to allay the sensation of griping in the intestines. Both these uses are relatively new, and were apparently the result of deduction and not experiment. Atropine paralyses certain nerve endings to glands and stops secretion. But there are no nerves excitation of which causes a secretion of milk, and therefore *a priori* atropine should have no action in this direction. This has been vindicated by Cushny, who showed that the action of the belladonna plaster in allaying secretion of milk was no different from an ordinary plaster. Nor have I been able in any way to satisfy myself from the literature or obtain evidence to show that atropine relieves griping, although I have performed a number of simple experiments for this purpose. This is a case where generalization from incomplete scientific evidence has caused us to go astray.

Of the significance of cholagogues we know nothing, and it is doubtful if any pathological condition which we can diagnose exists in which we are able to say that it is desirable to increase the secretion of bile. Furthermore, there is only one cholagogue worthy of the name, and that is "bile salts." Yet the use of ox gall is almost extinct.

Without dilating further on such examples, I will give finally three examples of how ignorance of absorption and excretion have led to the action of a drug being incorrectly defined. Potash salts are usually regarded as depressant to all living tissues, especially to the heart and circulation, and for this reason we are even warned against the use of potash water, and give our patients sodium bromide instead of potassium bromide. Now it is quite true that potash salts have such an action on living tissue when the salt is present in sufficient amount. But we have to correlate this fact on the one hand with the fact that vegetarians frequently take 60 to 80 grams—that is, about 2 oz.—of potassium chloride by the mouth in the twenty-four hours, and no special depression is, so far as we know, the result. Potash, then, cannot be regarded as poisonous when taken by the mouth, though it is extremely poisonous to living tissues in a certain concentration. The explanation of these facts I made clear by two experiments. In the one a large dose of potassium chloride (5 grams) was administered by the mouth to an anaesthetized cat; the circulation during the next two hours showed no signs of failure. In the second the administration of a like dose was made to a similarly anaesthetized cat, but which had previously had the renal arteries tied. In this animal the blood pressure fell 30 mm. of mercury in ten minutes, and death rapidly ensued from cardiac failure. Potassium is poisonous in a certain concentration, but when given by the mouth it is more rapidly excreted than absorbed, so that the concentration in the blood increases very little. By the mouth potassium is an excellent diuretic, but not a cardiac depressant; to produce the depressant effect it must be injected, when the rate of absorption exceeds that of excretion. The same facts are true of ammonium; the stimulant effect of ammonium salts on the central nervous system, and medulla especially, are only observed when their solutions are injected. Given by the mouth the excretion of ammonium salts is more rapid than their absorption.

Lastly, calcium is a drug which is well known to facilitate the coagulation of the blood. Yet in many cases careful experiments have shown that the administration of calcium by the mouth does not alter the rate of coagulation. Both facts are true. Calcium given by the mouth is absorbed to a slight extent only and very slowly. It is excreted about as rapidly, so that in a normal person the calcium content of the blood does not increase much; if the drug be given under the skin the effect is entirely different, the calcium content of the blood is increased, and the coagulation time under fixed conditions is diminished. Thus, in my own case calcium chloride or lactate taken by the mouth had little effect on blood coagulation, but injected under the skin the time of coagulation was reduced in fifteen minutes from three and a half minutes before injection to one and three-quarter minutes after.

DEMONSTRATION ON THE ACTION OF THE PRESSOR SUBSTANCES IN PUTRID MEAT, PLACENTA, AND ERGOT ON THE HEART AND UTERUS.

BY

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and

H. HALLETT DALE, M.A., B.C.Cantab., Director, Wellcome Research Laboratories.

As a preface to the demonstration, Dr. DALE said that Abelous was the first to find indication of the presence of certain pressor substances, having an action like adrenalin, in putrid meat. Later, Professor Dixon and Dr. Taylor found similar substances in placenta, and with Dr. Rosenheim came to the conclusion that these substances were not present unless a small degree of putrefaction had taken place. Barger and Walpole were successful in isolating two substances, iso-amylamine and parahydroxy-phenyl-ethylamine from putrid meat, probably identical with those which Rosenheim had obtained from placenta. The same substances were formed when a culture from human faeces was added to broth which contained tyrosin, so that it was not unlikely that those bodies were actually formed in the body during life, in conditions of constipation and stagnation of the intestinal contents. The same workers came to the conclusion that the activity of the liquid extract of ergot in raising the blood pressure was due to their presence also. The point of actien was the same as that of adrenalin, the peripheral ends of sympathetic nerves. Unlike ergot, the pressor action was produced when the drug was taken by the mouth. He himself had produced a great and prolonged rise of his own blood pressure by a moderate dose taken by the mouth. The action, though less marked, was invariably much more prolonged than that of adrenalin.

Professor DIXON then showed the effect upon the excised heart of a rabbit, perfused through the coronary arteries with Ringer's solution, of the injection of $\frac{1}{2}$ mg. of the active principle—marked acceleration and increased amplitude of beat. The tracing resulting was later compared with that obtained by injecting a solution of adrenalin, when it was seen that the effect obtained continued for a very much longer time.

Dr. DALE showed a similar effect upon a strip of the excised pregnant uterus of a cat. The muscular contractions became much more active and the muscular tone greatly increased.

DISCUSSION.

Sir WILLIAM WHITLA (Belfast) thanked Professor Dixon and Dr. Hallett Dale, whose demonstrations seemed to him to prove their point with clearness.

Dr. J. C. MCWALTER (Dublin) said it was interesting to note that alcoholic extracts of ergot were clinically inert, and that ordinary fluid extracts of ergot underwent a kind of putrefaction. Even when the fluid extract had undergone apparent decomposition it remained as active as ever. This suggested some identity between its active principle and that of putrid meat.

Dr. H. C. CAMERON (London) suggested that the substances whose action they had seen demonstrated might be of use in the symptomatic treatment of Addison's disease. Treatment with adrenal extract had been unsuccessful because it could not be given by the mouth and because its effects on injection were so short-lived. He noted that it was just in these very points that the substances under discussion differed from adrenalin—they acted when taken by the mouth and the action was long continued.

THE EFFECT ON THE LEUCOCYTE COUNT PRODUCED BY THIOSINAMINE INJECTIONS.

By F. J. CHARTERIS, M.D.,

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[ABSTRACT.]

WE owe the introduction of thiosinamine into medicinal use to Hebra, who in 1892 advised its use in lupus, claiming that it exercised a beneficial action upon the lupus tissue and obviated the formation of disfiguring cicatrices. The pain and discomfort following the injection of the drug in alcoholic solution—the method at first used—was obviated by the introduction, by Merck in 1904, of a soluble double salt, which, under the name of fibrolysin, has been very widely used and recommended. It consists of two molecules of thiosinamine combined with one molecule of sodium salicylate. Extravagant claims have been made for this preparation, and it has been recommended in such widely different conditions as Dupuytren's contraction, in pyloric obstruction, in urethral stricture, in chronic arthritis, in myositis ossificans, and even in locomotor ataxia and in optic neuritis. My own experience has not substantiated the favourable accounts of others.

I have used it in a number of cases, but have never seen any benefit result, though it has always been associated with local mechanical measures. Several forms of administration have been tested, but inunction, oral administration, and injection, have been utterly useless in cases of chronic fibrous adhesion of joints, and in diffuse fibrous formation in rheumatism.

Let me give typical illustrative cases. The inunction was tried for several months in fibrosis of the subcutaneous tissue without any benefit in two well-marked cases.

In a case of fibrous ankylosis of various joints following an attack of rheumatoid arthritis, the drug was tried for seventeen weeks in doses of 1 grain thrice daily by the mouth. Despite the fact that the adhesions were broken down under chloroform, and that massage, passive movements, and weight extension were used, almost no effect was produced; and as soon as these mechanical measures were stopped, the ankylosis became as bad as ever, despite the use of thiosinamine. In another case of older standing, in which rheumatoid arthritis had resulted in very firm fibrous adhesions of the wrist and fingers, the use of daily fibrolysin injections for three weeks produced no benefit, though combined with massage and electrolysis of sodium iodide.

In another case of fibrous ankylosis of the shoulder-joint, the adhesions were twice broken down under chloroform, but even with this fibrolysin injection failed to prevent the recurrence of fixation.

Investigations into the pharmacological action of the drug do not bear out the alleged selective action on fibrous tissue. Tyrode, the most recent investigator, found, in animals to which large doses had been given, rapid loss of weight and increased proteid metabolism, with fatty degeneration of the heart and kidneys, but he particularly noted that no histological alteration could be detected in the fibrous tissues of these organs. Leonardo states that he could find no histological changes in scar tissue, but that he obtained a marked leucocytosis in dogs.

Leonardo, Wolf, and others believe that thiosinamine is an energetic lymphagogue, which attracts leucocytes and produces local hyperaemia. During the past few months I have made many observations of the effect of thiosinamine upon the blood of individuals receiving the drug. First of all, I attempted to discover if it had any chemotactic influence. Thus, sterile glass capillary tubes were partially filled with the drug, in solid form and in solution, and introduced into the peritoneal cavity of pithed frogs. At the end of twenty-four hours the tubes were withdrawn and examined under the microscope to determine whether there was any accumulation of leucocytes in the tubes. In no instance could the presence of leucocytes be demonstrated inside the tube.

This finding is quite in accord with that of Winternitz, who found that thiosinamine caused no focal necrosis or local accumulation of leucocytes at the site of injection.

In an attempt to determine whether or not the drug has the power of causing any marked leucocytosis I have made numerous counts upon patients and upon healthy men. As a rule, after the injection of considerable doses no leucocytosis could be demonstrated. Sometimes there was a trifling increase in the number of white cells, and in a single instance an increase of 100 per cent. was recorded. The counts were made at first at intervals of forty minutes, and counting in some cases was continued for forty-eight hours.

A NEW MEMBER OF THE SAPONIN-DIGITALIN GROUP OF GLUCOSIDES.

BY

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[ABSTRACT.]

THE seeds of *Bassia longifolia*, popularly known as mowrah seeds, are imported in large quantities from India on account of a high yield of an excellent oil used in making the better classes of soaps. The residue left after the expression of the oil is valueless for the usual economic purpose of such seed residues—namely, the manufacture of feeding cake for cattle—because of its bitter taste. The attention of the authors was first called to the substance by the highly irritating action which it exerted when in contact with a cut surface or with the mucous membranes of the workers who were engaged in the manipulation of the meal after the oil had been expressed. At this time they were not aware of any similarity between the active substance and digitalis, but discovered it later when they came to perfuse the heart with the isolated glucoside. That the local action of digitalis was also highly irritating did not appear to be as well known as it should be. It was this action which led them to an investigation of the chemical and physiological properties of the active substance.

Regarding the chemical properties of the active substance, they found that it was readily soluble in water or alcohol, but practically insoluble in ether. It was therefore easy to obtain it in fairly pure condition by taking out in saturated alcoholic solution from the meal, decolorizing with charcoal and precipitating with excess of ether, filtering rapidly and drying in the desiccator over sulphuric acid; this process on repetition two or three times yields a pure white product. Analysis of this showed it to consist entirely of carbon, hydrogen, and oxygen, nitrogen being entirely absent. The mean of a number of combustions gave carbon 51.9, hydrogen 6.85, oxygen (by difference) 41.25 per cent.

The substance was shown to be a glucoside by its yielding about one-third of its weight as glucose on hydrolysis with acid, and determination of the sugar effected by weighing the copper oxide it was capable of reducing in a Gooch crucible. This sugar proved to be a hexose, yielding typical glucosazone crystals. Another one-third approximately consists of an organic acid, which the authors have named "mowric acid"; it possesses all the active properties of the mother-glucoside, "mowrin," although in somewhat lessened degree, when tested in equi-molecular solution.

The authors have not yet been able exactly to locate the remaining factor in the composition of the glucoside, but have ascertained that there is a certain amount of pentose present in addition to the hexose above mentioned, as shown by the strong furfurol odour on distilling, and by obtaining markedly the furfurol test in the distillate.

One of the most interesting properties is the powerful laking effects upon blood corpuscles in a saline suspension. This property is possessed much more strongly by the glucoside than by the salts of the separated mowric acid. The latter is quite a strong haemolytic, but the former is rivalled only by saponin. It is an important fact, to which reference has been made elsewhere, in relationship to the bio-chemistry of haemolysis, that as soon as the acid has been saturated with bromine it loses this haemolytic property.

Either the glucoside or the acid is poisonous when given hypodermically, the glucoside, again, being more powerful than the acid. Thus, 0.005 gram will kill a rat of 150 grams weight—the glucoside in about three hours; and of the sodium salt of the acid, 0.006 gram did not do so.

Examination of the organs after death of the rats killed by mowrin shows that the blood is black, probably due to laking, and that the whole area of the small intestine is engorged with blood and covered over with capillary haemorrhages. The intestinal mucous membrane is sloughed off, and the lumen is filled with blood and débris of the mucosa.

A dose short of the lethal one causes slowing of the heart, accompanied by a certain amount of dyspnoeic condition or air hunger. Tested on the isolated mammalian heart, in very dilute solution, the chief effects are slowing, with increased force of beat; the tracings showing a strong resemblance to that produced by digitalis.

In conclusion, the authors suggested that the drugs of this group which possess a common, well-marked collection of characteristics, probably produce their effects upon the heart muscle in a kindred way, and that the biochemical basis for their action is an affinity of a physicochemical kind between the glucoside molecule and the molecule of the heart lipoid.

SECTION OF DERMATOLOGY AND ELECTRO-THERAPEUTICS.

William Calwell, M.A., M.D., President.

DISCUSSION ON THE MUCOUS MEMBRANE LESIONS IN CUTANEOUS DISEASE.

OPENING PAPER.

By Sir Malcolm Morris, K.C.V.O., F.R.C.S.Edin.,

Consulting Surgeon, Department of Diseases of the Skin, St. Mary's Hospital, and Surgeon to Skin Department, Seamen's Hospital.

The subject proposed for discussion is a very large one, and naturally falls into two main divisions, according as the affection of the mucous membrane is primary—that is to say, a forerunner of disease which manifests itself later on the skin—or secondary. Secondary affections of the mucous membrane may again be subdivided into two groups, according as the disease develops on the mucous membrane independently or spreads to it by extension from the skin. These divisions, however, represent sets or sequences of clinical facts having distinctive characters. Logical as this classification may be, it is in the present state of knowledge impossible to follow it without being led into confusion. It will be simplest to deal with the lesions of the mucous membranes as they are seen in practice associated with the principal kinds of skin affections.

General Infections.

The rashes of the acute exanthematous fevers (scarlet fever, measles, rötheln, chicken-pox, and small-pox) do not concern the dermatologist so much as the general practitioner. Nothing, therefore, need be said here about them, except that in all of them the mucous membrane of the mouth and throat, and sometimes that of the nose, is usually congested and sometimes ulcerated. In erysipelas the erythematous rash sometimes starts from an orifice where skin and mucous membrane meet; or it may extend into the mouth, throat, and nose from the skin.

Drug Eruptions.

Drug eruptions are analogous to those of the acute exanthematous fevers; in both cases they are probably the result of toxic action. Arsenic has, perhaps, the most marked effect on mucous membranes. This shows itself in inflammation of the conjunctiva, throat, and mucous membrane of the stomach; in the nose the inflammatory process may be so severe as to cause ulceration, and even perforation of the septum. The rash caused by chloral may be papular, urticarial, vesicular, and petechial; the most general form is diffuse erythema. Sometimes it is scarlatiniform, and there is usually no sore throat; but not infrequently the mucous membranes are affected as well as the skin. Belladonna may produce congestion of the throat. Stomatitis is a familiar effect of mercury; sore throat is also sometimes caused by salicylic acid, salicylate of soda, and the iodides. I have mentioned but a few of the most common instances. The mechanism of drug eruptions need not be discussed here; they are a part of the physiological effects of the drug.

Syphilis.

Returning to general infections, syphilis, which spares no region or tissue of the body, and which imitates almost every form of disease, stands out on the foreground. I need not describe the primary lesion beyond recalling the fact that the most common sites of the hard sores are: In the male, the inner surface of the prepuce, the orifice of the meatus and the mucous membrane of the urethra; and in the female the inner surfaces of the labia majora and the nymphae, less frequently the clitoris. The vagina seems to be protected by the thickness of its epithelium. The anus and the lip may also be the site of primary syphilis. "Soft" sores are scarcely ever seen except on the genitals. In the secondary or eruptive stage, congestion of the mucous membrane of the throat often accompanies the characteristic roseola of the skin. Grooved ulcers may form on the tonsils; these present something of the crescentic outline of secondary syphilitic lesions on the skin, with a yellowish floor and grey-white borders. At a later period mucous patches and tubercles or condylomata may form on the mucous membrane. The most frequent site of condyloma is, in both sexes, around the anus. Condylomata sometimes spread inwards to the mucous membrane of the rectum. They also occur on the cheeks, tongue, lips, pharynx, and larynx. It is scarcely necessary to recall here that condylomata of the vulva are very contagious or that inoculation may be conveyed from mucous patches in the mouth and lips, either directly as by kissing, or indirectly, by pipes, glasses, etc. Among the "reminders" of syphilis—that is to say, lesions intermediate between the secondary and the tertiary forms—are sores on the sides of the tongue and white patches with thickening of its dorsum, resembling leucoplakia, which, strictly speaking, is an independent disease having nothing to do with syphilis, though presenting very similar characters. In the tertiary stage the mucous membrane may become the seat of chronic inflammation and ulceration; the consequent cicatrization may lead, as every one knows, to great narrowing of the pharynx, rectum, and vulva. Gummata may form on the tongue. The characteristic symptom of congenital syphilis is the peculiar inflammation of the lining membrane of the nose causing "snuffles." Other common lesions in this stage are condylomata about the anus and sores about the corners of the mouth. I have seen ulceration of the pharynx, accompanied by an eruption on the face somewhat resembling lupus, as a late manifestation of hereditary syphilis.

Lupus Vulgaris.

Among the manifestations of tuberculosis on the mucous membrane the most important is lupus vulgaris. The starting point of the disease is certainly, in a large proportion of cases, in the nose, from which it spreads to the face. According to Finsen, in 70 to 80 per cent. of the cases treated at the Copenhagen Light Institute the mucous membrane of the nose or mouth was also involved. The characteristic apple-jelly nodule can often be seen in the skin within the nostrils on which hairs are found, after pressing the surface with a flat glass. Dr. StClair

Thomson tells me that the application of adrenalin with cocaine blanches the surface of the mucous membrane of the nose, so that the nodules of apple-jelly become visible. From its point of origin in the nose the disease often spreads up the lacrymal duct, appearing later on the face. The mucous membranes of the cheeks, soft palate, pharynx, and larynx, and of the anus and vaginal canals are sometimes invaded by extension from the neighbouring skin. Occasionally the larynx is attacked primarily. In cases of primary lupus of the throat the eruption may, according to Stelwagon, consist of an insignificant or moderate diffused infiltration, with slight papular or tuberculous elevations or papillary excrescences, or the area may be studded with whitish epithelial opacities. Superficial ulceration is not uncommon and may assume a serpiginous configuration, or it presents the aspects of a raw granulating patch.[1] It is said that the tympanic membrane may be invaded through the Eustachian tube from the throat. Primary lupus of the tongue has been observed by Darier, but it is very rare. In an old-standing severe case, in which the palate was extensively affected, the tongue became affected. I have seen in a lady past middle age, who had suffered for years from lupus of the face and other parts of the body, a secondary development of the disease in the vagina and on the os uteri.

The following statistics collected by Max Bender throw light on the frequency with which mucous membranes are attacked by lupus and on the sites affected. In 380 cases lesions of the mucous membrane co-existed with disease of the skin in about 45 per cent. (173 cases), but in only 6 cases was the disease limited to the mucous membranes. Of 147 of these cases it was ascertained that in 46 cases, or 31.2 per cent., the mucous membrane was the part originally attacked. While in a number of instances but one mucous surface was invaded (nose 75, tear duct 9, conjunctiva 8, lips 12, palate 11), in many several regions were the seat of the disease. The observations are summarized as follows: The mucous membrane of the nose was found implicated in 115 cases, conjunctiva in 21, tear duct in 24, lips in 43, palate in 31, tongue in 1, larynx in 13, rectum and vulva in 1.

Leprosy.

In leprosy it is now thought probable that the disease tends to show itself first on the mucous membrane of the pharynx and upper air passages; hence, an early symptom is the hoarseness which was looked upon with such suspicion in the Middle Ages. The disease may also begin in inflammation of the mucous lining of the nose. When characteristic skin leprosy is fully developed nodules often form on the conjunctiva and the mucous lining of the nose, mouth, pharynx, and larynx. In these situations the nodules have a red or grey colour, and may resemble syphilitic lesions. The tongue may be greatly infiltrated, the nodules being separated by fissures recalling those of syphilis. As infiltration proceeds in the throat the voice is reduced to a whisper, there is increasing difficulty in breathing, and tracheotomy is often called for, owing to the sudden occurrence of oedema of the larynx. In the anaesthetic form of leprosy the mucous membrane of the mouth, soft palate, and back of pharynx often lose sensibility, with the consequence that swallowing becomes difficult and regurgitation of food and drink often occurs. I have recently seen a patient sent to me from one of the West Indian islands with very early signs of anaesthetic leprosy on the skin. In the left nostril is an ulcer, swabbings from which I have had examined by Dr. G. L. Eastes. He reports that the films from the ulcer contain numerous acid-fast bacilli, which are presumably the *B. leprae*. He states that the bacilli are more numerous per unit of material than tubercle bacilli would usually be in similar material. I have thought it worth while to mention this case, as it proves from a bacteriological point of view and exhibits the fact that the mucous membrane is often early involved, and its recognition is a great aid in diagnosis.

Diseases of the Tegumentary System.

Erythemata.

Coming to skin diseases proper, we can only glance at the most common of them. It would be out of place, even if I had time, to describe the cutaneous lesions or to discuss the etiology and pathology of the diseases. The erythemata claim the first place; they correspond in many respects to the eruptions in zymotic diseases, and are, in many cases at least, the result of toxaemia from the intestines. Speaking generally, erythema is a congestion due to vasomotor disturbance, either transient or lasting a longer or shorter time, and taking variously-shaped, circumscribed patches of redness, punctiform or finely papular on the surface. Erythema multiforme is the only variety of erythema that need be touched upon here. Congestion of the pharynx is often one of the symptoms ushering in the eruption on the skin; in the developed disease the mucous membrane of the mouth and pharynx and conjunctiva may suffer, and at the height of the attack the tongue is sometimes greatly swollen.

Urticaria.

Passing to urticaria, the mucous membranes of the eyelids, lips, mouth, tongue, pharynx, and vulva may be the seat of wheals. In these situations oedematous swellings may occur, and if the glottis is attacked difficulty of breathing, and even actual suffocation, may result. I have a patient, a medical man, who has suffered from periodical attacks of urticaria of the mucous membrane of the mouth for the greater part of his life, the swelling affecting the palate and the tongue. It is said that wheals may develop in the Eustachian tube and middle ear. The mucous lining of the bronchi may also be the seat of the eruption; this probably explains the frequent association of urticaria with asthma. The asthma may accompany the appearance of the disease of the skin or may alternate therewith. Some believe that the stomach and digestive canal are also occasionally attacked. In urticaria pigmentosa the eruption may extend into the mouth and on the palate.

Pemphigus.

In pemphigus, the mucous membrane of the nose, mouth and pharynx are often attacked. Characteristic bullae may be seen on the mucous surface of the larynx and trachea causing suffocative symptoms. Sometimes they develop on that of the bronchial tubes. Kaposi says the eruption may appear first on the mucous surface and may be the forerunner of the cutaneous disease. Dr. J. A. Fordyce says[2] that an eruption in the mouth may precede the development of general pemphigus by several months and he relates a case in illustration. I am unable from my own experience to confirm the observation that pemphigus may begin on the mucous membrane of the mouth. Ulcers resulting from pemphigus bullae have been noted on the vagina, and Cheadle has recorded a fatal case in which ulcers apparently traceable to the same cause were found in the intestine. Pemphigus of the conjunctiva is associated with "essential shrinking" of that structure, an example of this was reported by Leslie Roberts and myself, and we gave references to twenty-seven similar cases.[3] In pemphigus vegetans the first points attacked may be the labia majora and minora; in other cases it begins in the mouth, on the soft palate in the neighbourhood of the lips or nostrils, or around the anus. Later it may appear on any part of the skin. When the mouth is attacked the mucous membrane becomes dry and cracked, and swallowing is so painful that the patient will not take food. This hastens the fatal ending of the disease, which is caused by exhaustion.

Dermatitis Herpetiformis.

In dermatitis herpetiformis the mouth, throat, nose, the pharynx and larynx, and the conjunctiva may be the seat of lesions. I have seen a case in which there were very severe lesions in the vagina as well as in the mouth. Blebs in the mouth lesions sometimes precede those of the skin. I have seen a case in which the disease first showed itself on the tongue; this was followed by an outbreak of vesicles on the face and arms, and afterwards by a more general distribution.[4] Fordyce says that, as the result of pyogenic infection, a vegetating dermatitis sometimes develops secondarily to dermatitis herpetiformis, and that in those cases it is not uncommon to see erosions and ulcerations about the mouth and lips. He has had a man under observation for some time, and when

[1] Stelwagon: *Treatise on Diseases of the Skin.* Fifth edition. Philadelphia and London.

[2] *New York Medical Journal*, March 6th, 1909.
[3] *British Journal of Dermatology*, 1889, vol. i, p. 175.
[4] Ibid., 1897, ix, p. 213.

the dermatitis herpetiformis was at its height, in addition to the eruption on the skin, there were erosions, cracks, and ulcerations on the palate and lips; even partial atresia of the mouth was caused by inflammatory infiltration, which had extended to the subcutaneous muscular tissue. In the relapses which occurred in the course of the disease the lips were always more or less involved.[5]

Epidermolysis Bullosa.

In epidermolysis bullosa there is often a hereditary tendency to the formation of bullae as the result of slight injury, and the lesions may form on the mouth and lips. I have watched three children in one family almost from their birth who were subjects of this disease. All had lesions of the mucous membrane of the mouth. In one the disease also affected the intestinal tract, any food in the least bit hard causing bleeding. One died, worn out by the disease, at the age of 18. I have recently seen a typical case in which the disease had existed for twenty-eight years. Among the lesions are bullae under the tongue, which the patient said was caused by biting hard substances.

Herpes.

Herpes is often symptomatic of a febrile condition; its occurrence on the lips and about the nares in pneumonia is familiar to all. The tongue may be affected in connexion with the lips. The vesicles break rapidly, forming shallow ulcers. On the lips the vesicles usually end in scabs. More often herpes is caused by local irritation. Its most common form is in coryza where it occurs on the lip as a result of the discharge from the nostrils. It also frequently attacks the mouth and throat. The mucous membrane of the genitals in both sexes is especially prone to herpetic eruptions. In men the points of selection are generally the internal surface of the prepuce, the sulcus, the glans, and the meatus; in women the labia and the cervix.

In women the eruption is apt to become confluent, and in some cases not only the vulva, but the perineum, and the inside of the thighs, and the mons veneris, may be invaded. The labia majora and minora and the mucous lining of the vagina become greatly swollen, and covered with macerated epithelium, which, as it separates, leaves extensive excoriations. Genital herpes is more common in men than in women. Genital herpes is often brought on by the first attempts at sexual intercourse after marriage. It may also be the result of irritating discharges (leucorrhoea, gonorrhoea), or it may be related to the menstrual function.

Herpes Zoster.

Herpes zoster often attacks the conjunctiva and the eyeball, and sometimes leads to serious mischief owing to the scarring which it produces. It is occasionally seen in the mouth, especially on the tongue. Head says that, although the eruption is frequently bilateral and is thus of the nature of symptomatic or irritant herpes, he has sometimes, though rarely, seen cases in which the eruption on the tongue was unilateral, and was not associated with an eruption on the lips or palate. Such cases may, he thinks, be examples of true zoster. The hard palate may also be the seat of herpetic eruptions.

Eczema.

Eczema, which is a catarrhal inflammation of the skin, presents analogies with catarrhal conditions of mucous surfaces. In ordinary eczema the mucous membrane is never, as far as I know, solely the seat of disease; but it often spreads from the skin to adjoining surfaces, such as the lining membrane of the nose, the eyelids, the lips, the glans penis, the vulva, and the anus. The membrane becomes dry and thicker than normal; sometimes there is a muco-purulent discharge. Crusts may form, with subsequent cracking. On the other hand, eczematoid eruptions may be produced on adjacent parts of the skin by the trickling discharge from the nose, the mouth, or the genitals.

In eczema seborrhoicum the red part of the lips may be involved, and the disease may sometimes (according to Stelwagon) be limited to that part. In 2 cases under his care the vermilion of the lips was the seat of persistent and repeated thin exfoliation; hence he calls the condition cheilitis exfoliativa.

[5] *Journ. Cutan. Diseases*, xxiv, p. 543.

Lupus Erythematosus.

Lupus erythematosus may affect the margin and inner surfaces of the lips and cheeks, the conjunctiva, the hard and soft palate, and the larynx may also be attacked, usually by extension from the skin. When the lips are attacked they are swollen and purplish-red; at a later stage they become dry and scaly; finally, the lesions show an atrophied greyish centre surrounded by a hyperanaemic zone (Fordyce). On the cheeks the patch is sometimes an abrased surface, varying in colour from a bright red to pale. On the conjunctiva the surface is congested, and there may be slight thickening. In a case recorded by Stelwagon in which a patch extended from the skin to the lining membrane of the nose there was considerable infiltration in that part. On the cheeks and tongue the lesions often bear a close resemblance to leucoplakia, or to lichen planus. In the case of a gentleman whom I saw, coincidentally with patches of lupus erythematosus on the skin of the face, there was a crack extending through the whole substance of the lower lip, with thickening around. There was also a white patch of leucoplakia on the left side of the mouth, which had been diagnosed as syphilitic. It had exactly the appearance of lichen planus.

Wilfred Warde holds[6] that lesions of the mucous membranes, especially of the mouth and nose, are comparatively frequent in lupus erythematosus. In particular he says that rhinitis is often associated with the cutaneous affection. In 15 cases of lupus erythematosus he found 9 of rhinitis, in 6 of which there was ozaena. He adds that atrophic changes in the tympanum and external auditory meatus are frequent concomitants of lupus erythematosus. In 8 of his 15 cases the lining of the auditory meatus and the drums presented the well-marked appearance of atrophy. In 4 cases he found atrophic patches in the mouth, swelling of the whole mucous membrane with increase of stratified epithelium in 4, and retention cysts in 3. In only 4 of the whole number of cases did the mucous membrane appear healthy, and even in these Warde seems inclined to say with the poet that things are not what they seem, as from a careful examination of them he got the impression that "there might be a general atrophy corresponding to that in the nose and yet extremely hard to detect." I have seen the lining of the meatus and the drum scarred from atrophy after the lesion of lupus erythematosus had disappeared from these situations.

I have myself seen lupus erythematosus in the vagina in the case of a woman who also had a "raspberry tongue."

Lichen Planus.

In lichen planus the mucous membrane is not infrequently attacked. The part generally affected is the mouth, most often opposite the function of the upper and lower teeth. The whole surface of the cheeks, with the palate and fauces, may be invaded. The lesions have the appearance of white dots and patches. On the tongue they closely resemble leucoplakia. I have had a case under my care in which lichen planus in the mouth was diagnosed as that condition. The true nature of the disease was shown by the presence of lichen papules on the skin—arms, wrists, palms, abdomen, legs.

The red of the lips when they are affected looks as if tattooed with some white substance (Brooke). The eruption in the mouth may precede any manifestation on the skin, or it may appear when these have cleared up. I have observed a case of a woman aged 51, who had white patches on the tongue and cheeks for two years. There was neither history of syphilis or alcoholism, and the patient had never smoked. About two years later she had an attack of general lichen planus, which lasted a year. The lesions of the mouth disappeared when the skin lesions ceased. In some cases the eruption in the mouth may be the only symptom of the disease, but the diagnosis, in my opinion, is impossible without lesions on the skin. The mucous membrane of the genitals is not often attacked, but the characteristic milk-white patches are sometimes seen on the inside of the labia.

Leucoplakia.

It is necessary to lay stress on the fact that leucoplakia, or "white patch," of the tongue is often quite independent

[6] *British Journal of Dermatology*, September, October, and December, 1902; May, 1903.

of syphilis. It occurs not only when there is no history or evidence of syphilis, but when the patient has never smoked. It is not, as far as I have observed, connected with gout or rheumatism. It is a troublesome condition, the white patches often being associated with thickening and with painful fissures. In a certain proportion of cases it is followed by the development of epithelioma. I have not observed the association of leucokeratosis of the mouth with lichenization, which Fordyce says he has seen. In connexion with the tongue, I may mention that I have never observed the so-called "Wandering rash" of that part associated with lesions of the skin, although I have watched some cases for years.

Psoriasis.

In psoriasis most observers deny that the mucous membrane is invaded, but it is said to have been found in the lining of the genital passages, and Fordyce has seen it on the lower lip. I cannot confirm this statement from my own experience.

Other Affections.

I have left myself but little time to speak of other conditions. They can therefore be touched upon only very lightly.

Impetigo contagiosa, which is due to the inoculation of a staphylococcus, may be accompanied by pustular eruption inside the mouth in children, but it is rare. According to Payne, the original source of infection is always some form of suppuration, not necessarily on the skin. He has traced the connexion of the cutaneous disease with conjunctivitis, otorrhoea, purulent rhinitis, ulcerative stomatitis, and even purulent vaginitis. Conversely, he has seen these conditions originate from impetigo on the skin.

In impetigo herpetiformis, a disease characterized by a circinate eruption of small pustules on a red base, which appear on the groins, navel, breasts, and armpits, Kaposi says that in some cases circumscribed grey patches depressed in the centre are seen on the mucous membrane of the tongue and palate, uvula, and posterior wall of the pharynx.

In tinea circinata of the face the disease has in rare cases spread to the mucous membrane of the mouth by extension from the skin of the face; and the mucous membrane of the vulva may be attacked secondarily in cases of eczema marginatum.

In sclerodermia the induration has in a few cases extended to the mucous membrane of the mouth, pharynx, eyelids, and vagina. Rhinoscleroma—a new growth which thickens and hardens the parts in which it develops and blocks up the nasal passages and sometimes the larynx—usually appears first at the junction of the nose and upper lip. It may spread downwards over the upper lip, or upwards into the nose, involving the mucous membrane of one or both nostrils and the septum; it also spreads along the naso-pharynx, and may affect the soft palate and the mouth. In some cases the palate or fauces may be the primary seat of the growth. According to Kaposi the larynx may be the primary seat of the disease, whence it may extend to the trachea.

In acanthosis nigricans—a disease characterized by a peculiar pigmentation of the skin with warty growths—the mucous membrane of the mouth is dry and wrinkled, and the characteristic warts are seen on the palate, gums, tongue, and inside the cheeks. The tongue is swollen and cracked, and the thickening of the mucous membrane lining of the mouth causes discomfort. The vagina may also be covered with warts. The growths on the mucous membrane have not the characteristic dark staining seen on the skin.

Xanthoma begins generally on the eyelids. The mucous membrane of the mouth, pharynx, respiratory passages, gullet, and bile duct may be affected.

Diagnosis.

Though this paper is little more than an enumeration of conditions in which the mucous membrane may be affected, it will, at any rate, serve the purpose of impressing upon practitioners how important it is that in all cases of skin diseases the mucous membrane of the mouth and nose should be examined. If there is any symptom to direct attention to other mucous surfaces, these too should be carefully inspected. As has already been said, the lesions of mucous membranes in skin diseases are seldom sufficiently characteristic to form the basis of a diagnosis. Hence the recognition of their true nature in the absence of any skin affection which may throw light upon the case presents enormous difficulty. On the mucous membrane we lose the variety of colour, which is so useful a guide in skin disease. The difficulty arises when mucous membranes alone are the seat of lesions. In such cases, syphilis is always the first thing to be thought of. But it is most important to remember that, as has been stated, there are conditions not uncommonly met with, notably herpes of the prepuce or vagina, lupus, and true leucoplakia—which are wholly independent of syphilis. It has been stated that by proper examination the apple-jelly nodules of lupus can often be seen on the little strip of skin which extends inwards from the surface of the nostrils. It may not be amiss to say in passing that a well-known authority in diseases of the nose has declared that this small territory belongs not to the rhinologist but to the dermatologist.

In pemphigus the shreds of the broken blebs, and in herpes zoster the ragged fringes of the ulcer partly covered with the remains of vesicles, may reveal the nature of the disease. But, unfortunately, as a rule, the lesions themselves do not, like those on the skin, tell their own story, even to the most experienced eye. Hence, the history of the case and the nature and distribution of the skin lesions, or the absence of cutaneous eruptions, must be taken as guides. This, of course, is all very vague and unsatisfactory; but I suppose it is precisely because the subject is one about which little is known that it has been chosen for discussion. I have only brought together a few materials of which I confess I cannot form a body of doctrine. If even a definite beginning is made here towards the achievement of that object, this discussion will contribute greatly to the advance of dermatology.

Treatment.

The treatment need be referred to only in the most general way. It must be directed to the cutaneous disease of which the lesions of the mucous membrane are an extension, or to the constitutional state of which they are manifestations. In the mouth and vagina it is most important that no caustics should be used. This is the first impulse of the practitioner, but unless there is a definite mass to be destroyed it should be resisted. The use of caustics has led to grave irritation causing difficulty in diagnosis; it may even tend to the development of malignant disease. The applications should be in the vast majority of cases gentle and soothing in their action. In the mouth mild disinfectant washes are most generally useful. In the anus and vagina the contact of contiguous surfaces should be prevented.

In the treatment of mucous patches and warty syphilitic growths on the tongue, chromic acid in a 5 per cent. solution, as employed by Butlin,[7] is most useful. I can testify to the good effect of the same remedy in painful conditions of the tongue caused by tobacco. In old patches of leucoplakia and other precancerous conditions, as well as malignant disease, radium is the most serviceable agent. Dr. Louis Wickham relates[8] some cases in which great improvement resulted from its application. He says, however, that observations of its effect on the buccal mucous membrane are still few in number and too recent to allow any definitive conclusion to be drawn from them.

DISCUSSION.

Dr. Louis Wickham (Paris) said that the relation of lesions of the mucous membrane to skin diseases was a very important one. In syphilis, to take only one example, both in diagnosis and in treatment, it was necessary to bear in mind this relationship. At the beginning of his practice a man came to him with apparently polymorphous erythema of the skin. The characteristic lesions made the case easy to diagnose. But, after the diagnosis had been made, several lesions on the mouth and tongue and mucous membrane of the cheek made their appearance, and these so evidently had the aspect of syphilis that he was obliged to alter his diagnosis. Some days afterwards, however, lesions appeared upon the feet of the patient, and these were of a character at once to bring

[7] *Diseases of the Tongue.* London, 1900, p. 197.
[8] *Radium Therapie.* Paris, 1909.

back his former diagnosis of polymorphous erythema. He brought the case before his colleagues, and they, looking only at the patient's body and mouth, said, "That is syphilis without a doubt"; but when they saw his feet, they said, "It is polymorphous erythema." The case was really polymorphous erythema, with the exception that the lesions of the mouth had exactly the aspect of those of syphilis. Therefore, especially when the lesion came in the mouth, there was often likely to be confusion between these two conditions. The question of treatment when the mucous membrane was involved was also very difficult and delicate, and sometimes, when there were lesions both of the skin and mucous membrane, it was possible to cure the one without curing the other.

Professor R. B. WILD (Manchester) said that the point of greatest importance in Sir Malcolm Morris's paper was his insistence upon the need of looking for lesions of the mucous membrane in all cases of skin disease. Cases were met with frequently in general practice in which, to outward appearance, there were only a few spots of lupus vulgaris, while deeper examination showed that the lupus had eaten away a large portion of the nasal mucous membrane, and had perhaps been going on for years. Sir Malcolm Morris had called attention to the fact that these mucous membrane lesions might even begin before the skin lesions, and much good could be done prophylactically if the mucous membrane were systematically inspected. With regard to the association of these mucous membrane lesions with skin lesions, there was no hard-and-fast line to be drawn between the epidermic tissues of the involuted mouth and the general epidermic tissue which formed the surface of the skin. Such lesions could, indeed, be divided into groups: (1) Lesions of the mucous membrane and skin together might frequently be associated with certain general diseases—such as purpura with haemorrhage from both skin and mucous membrane, and measles with diarrhoea and bronchitis, as well as nasal catarrh and skin eruptions. The skin eruption might be part of a general disease affecting the whole system of the body, and the poison might manifest itself either on the skin or the mucous membrane, not picking out any one part particularly. (2) Another group of lesions might be set down to those cases in which both tissues were governed by one nerve supply. Here, again, the frequency with which eruptions of the skin trespassed on those parts of the mucous membranes influenced by the same trophic nerves might be explained. Thus they had two groups of mucous membrane lesions in relation to skin lesions which could be regarded as possessing some anatomical or pathological-anatomical basis. In addition to these, one or two other special conditions remained to be considered. One of these related to skin diseases in which the mucous membranes only were involved. Every one knew how frequently leucoplakia was mistaken for lichen planus. It was difficult to diagnose from the appearances of the mucous membrane alone, and he believed that several cases which were stated to be leucoplakia were in reality cases of lichen planus in which the mucous membrane alone was affected. The publication of Sir Malcolm Morris's paper would do great service in drawing attention to this subject.

Dr. J. H. SEQUEIRA (London Hospital) said that the importance of the subject under discussion had been impressed upon him particularly with regard to lupus vulgaris. He had seen a very large number of cases at the Finsen Light Department of the London Hospital, and he had been impressed with the importance of early diagnosis of lupus of the nose. The general practitioner, and even the specialist, overlooked a good many of these cases. He would mention one interesting case—that of a member of their profession who had been attending an ophthalmic surgeon for epiphora. For several years he had been undergoing various examinations, until at last a few spots of lupus on the outside of the nose led to an investigation which showed that this patient had an extensive nasal lupus. He (Dr. Sequeira) was continually meeting cases in which the earliest symptom of lupus of the nose was epiphora. The disease began probably by local infection in the inferior meatus, with consequent obstruction of the nasal portion of the lacrymal duct. He wished, therefore, to lay stress upon epiphora as one of the earliest symptoms of lupus of the nose. Another point of interest was that lupus vulgaris of the palate was very often directly secondary to lupus of the nose. There was frequently a patch in the palate in the situation of the anterior palatine foramen. He believed that in this type of case the primary seat of the disease was again in the inferior meatus; local infection was carried probably by the finger-nails and spread through the anterior palatine foramen. With regard to the frequency of lupus of the mucous membrane, out of nearly a thousand lupus cases at the London Hospital about half had lesions in which the mucous membrane was involved. He thought he was right in saying that the type of case in Finsen's clinic in Copenhagen, where the frequency was 80 per cent., was rather worse than in London. Naturally, Finsen attracted the bad cases from all parts of Northern Europe; therefore a fairer average might be obtained in the clinic of the London Hospital, where it worked out at about 50 per cent. With regard to lupus erythematosus, Dr. Thomas Smith found that out of about 60 cases, 28 per cent. had mucous membrane lesions of the kind that Sir Malcolm Morris had described. He (Dr. Sequeira) had been in communication with Dr. Turtle, the medical officer of Hackney, who had to inspect a large chemical works where arsenical dyes were manufactured. These dyes were largely used by Canadian farmers for weed killing, and as it was necessary to have green dyes they used copper arsenite. Lesions of the nose were very common among the workers in this factory, and Dr. Turtle stated that sometimes in the course of a week or ten days the workers became subject in many cases to a perforation through the soft part of the nose. Nearly every man who had worked in that factory for a considerable length of time had a perforated nasal septum, and the hole was sometimes large enough to admit the finger. The interesting case mentioned by Dr. Wickham illustrated the difficulty, especially felt in the early days, of diagnosing between syphilis and polymorphous erythema or erythema multiforme. He was asked frequently to see cases of mucous membrane and skin eruption in which a diagnosis of syphilis had been made. One case of syphilis was very similar to that which Dr. Wickham had described. There were a few erythematous blisters, and a very large eruption of bullae in the mouth. The case was diagnosed as syphilis, and the patient was put on mercury, which made his mouth very much worse. They would do well to focus a considerable amount of attention upon the subject which Sir Malcolm Morris had brought forward.

Mr. C. M. CUNNINGHAM (Belfast) said that in his practice as a dental surgeon he occasionally saw peculiarities in the mucous membrane of the mouth which, inasmuch as it was his duty not to increase the irritation if possible, caused him some anxiety. The last speaker had referred to the use of arsenic and its effect upon the mucous membranes. In the practice of dental surgery they were almost compelled to use arsenic, because it was practically the only method they had. Of course, they used it with great caution, because it acted in such a highly destructive way. It was so penetrating and so difficult to control that they had to exercise the greatest care, and this care might not always be exercised by unqualified men. In using arsenic they were careful to employ a varnished dressing of some kind, but within a couple of days if left alone the arsenic would penetrate through this dressing and affect the tongue, cheek or pharynx, causing difficulties in swallowing. Sometimes considerable local disturbance was set up in that manner. He had never noticed any serious constitutional disturbance, but arsenic was so constantly used by dentists—by unqualified as well as qualified practitioners—that it was worth while to know of this local action and of the possibility that disturbance might be caused by the indiscreet use of the drug. He would be glad if the use of arsenic in the mouth could be abolished, but at present this seemed hardly possible.

Dr. J. GOODWIN TOMKINSON (Glasgow) said that the importance of invariably exploring the mucous membranes, more especially the buccal and nasal, could not be insisted upon too dogmatically. The rule should be followed, not only when the practitioner was dealing with cutaneous affections, but also when he was brought into touch with any other morbid manifestation. He was fully aware that many observers described a non-specific as well as a specific form of leucoplakia. There were others, however, who inclined to the view that it was

always a manifestation of syphilis, and in the vast majority of cases syphilis of the acquired type. In a very suggestive monograph by Lacapère, entitled *La Leucoplasie*, a series of consecutive cases of leucoplakia was etiologically dealt with, and in every instance a definite or probable syphilitic cause was mentioned. He believed he was correct in saying that Fournier stated that at least 80 per cent. of cases of leucoplakia were undoubtedly due to syphilis. Doubtless the remaining 20 per cent. were of identical origin, some of them occurring in patients who were reluctant to admit that they had had syphilis, while others might be regarded as a heritage from parental delinquency. In referring to cheilitis exfoliativa, it was of interest to record that the brother of one of his (Dr. Tomkinson's) patients suffering from that affection was the subject of psoriasis. Both exhibited symptoms of gastro intestinal disturbance and moderate anaemia. He was not prepared to state that these affections were generically related, as in view of the probable microbic origin of the former he would be very reluctant to dogmatize. The amenability of tuberculous lesions of the mucous membranes to radiotherapy appeared—at least in so far as his experience went—to vary somewhat with the region affected. Certainly he found the nasal mucous membrane much more responsive than the buccal to *x*-ray therapy. In the latter he found that daily applications of lactic acid were of distinct value. These should be made by the physician himself. Upon this last point he could not too strongly insist. Reverting to the diagnostic value of mucous membrane lesions, one was often enabled to diagnose accurately cutaneous cases by a thorough examination of the buccal mucous membrane. Apropos of obscure etiology, he well remembered Dr. Beurmann once saying that in the presence of a case of doubtful origin one should always think of possible syphilis or tuberculosis. They were agreed that to mistake the former might be fraught with horribly disastrous consequences. On that account it would be well invariably to regard every patient with whom they as dermatologists were confronted as a sufferer from syphilis until they had excluded that affection.

Dr. S. ERNEST DORE (London) said that another important factor that arose out of Sir Malcolm Morris's paper was the advisability of conferring with their colleagues of the Laryngological Section, as the particular knowledge possessed by laryngologists of the conditions affecting the mucous membrane was of great importance. Sir Malcolm had spoken of lichen planus. He (Dr. Dore) had looked for lichen planus in the mucous membrane of the nose, believing it not unlikely that such a condition might occur. Dr. Osler's group of cases, in which certain affections of the skin were associated with visceral conditions, was most interesting and important. Why should not lichen planus affect the intestinal canal and give rise to certain symptoms? Sir Malcolm had also referred to nasal lupus. They should always be on the look-out for those conditions so as to get clues to diagnosis.

The PRESIDENT (Dr. Calwell) said that in his presidential address he had suggested that the study of dermatology was of such great profit that it might very well be put among the earlier studies of students. His idea was that it would, by analogy, illustrate the processes of general disease. After what had been said by Sir Malcolm Morris and others, however, it seemed that, not only in analogy, but actually and in fact, the relation of dermatological phenomena to certain general diseases was very close indeed. He wished that Dr. Campbell Rankin had been present, as he and his colleague, Dr. Craig, had drawn up particulars of a number of most interesting cases bearing upon this subject. In some of the cases of lesions of the mucous membrane the anatomy of the part affected made the treatment difficult, and at times—particularly in children—an otherwise trifling affection of the mucous membrane would, by reason of its seat, give rise to considerable anxiety.

REPLY.

Sir MALCOLM MORRIS, in replying, referred to the fact that he was the secretary of the first Dermatological Section of the British Medical Association which met in Ireland—at Cork—thirty years ago. He recognized the fact that his had been a loose, discursive paper, merely dancing over a vast subject. But if it impressed upon practitioners the need for examining the mucous membrane it would be the means of saving them from frequent mistakes. Only recently a general practitioner sent him a case of what was thought to be slight lupus in a young girl. The disease was believed to be limited to the three or four nodules which had made their appearance, but as a matter of fact the lupus had been going on in the nose for some time, and there was perforation of the septum. If practitioners only had a routine method such mistakes would not occur, and probably a great amount of secret destruction would be prevented. He was glad to hear a dentist take part in the discussion. In this matter they as dermatologists needed the co-operation of dentists as well as that of laryngologists and rhinologists. It sometimes happened that the rough edge of a tooth would start leucoplakia, and this would run on to epithelioma if neglected. The person must have something with which to masticate, and it was not easy always to get a perfectly rounded surface. The irritation from the plate of false teeth was also sometimes a matter of considerable importance. He wished to know whether there was any difficulty in the composition of such plates. A red one which he had seen from time to time had made him suspicious. Now and then the arsenic was a source of irritation. It might be possible to give up the use of arsenic in dentistry. There was a time when Vienna paste and other arsenical preparations were the only things used for the skin, but to-day, although these were still used by quacks, they had very largely gone out of favour among legitimate practitioners, and such things as salicylic acid had taken their place. Why not in dentistry also? He was glad to hear the statistics which Dr. Sequeira had to bring forward. Dr. Sequeira was attached to the skin department of the largest hospital in London, and his statistics were perhaps more valuable, because more normal, than those which came from Finsen's clinic. They were well aware that in cases of progressive lupus people would go to the uttermost ends of the earth to be cured, and therefore Finsen's clinic attracted the most advanced cases in Northern Europe. With regard to what Dr. Tomkinson had said, the great desideratum in all these cases was to have in mind a logical idea of the order of disease, and always to consider that people had all the possible diseases until it was proved that they were free from them. This negative process of elimination was the most valuable that could be followed. They were sometimes charged by the general physician, and even by the general practitioner, with being people of only one eye—only looking for one thing. That, of course, was a mere *façon de parler*. They first knew their general medicine, and then came to the department. And the rule he had always followed was always to have syphilis or general infections in mind, and to exclude these before coming to dermatology. He thanked Professor Wild, who had a very large clinic in Manchester, for his encouragement to observe the mucous membranes as a matter of routine practice; and also Dr. Wickham for his interesting remarks on diagnosing syphilis from skin affections such as erythema multiforme.

Mr. CUNNINGHAM, in reply to the dentistry question raised by Sir Malcolm Morris, said that owing to the competition which they as dentists had had to meet on the part of unqualified practitioners, there was no doubt that many plates had in the past been made with inferior rubbers, and the colouring matter introduced was sometimes of poor quality. Their methods were now so far advanced, however, that in most cases metallic plates could be used, and it was only a question of the dentist taking care and trouble to make a very clean and wholesome plate. With regard to the use of arsenic in the mouth, they had tried very hard to get a substitute, but up to the present it had seemed almost impracticable.

A CASE OF ACANTHOSIS NIGRICANS.

By ROBERT B. WILD, M.D., M.R.C.P., M.Sc.,

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[ABSTRACT.]

ACANTHOSIS NIGRICANS is a rare disease, first described in 1890 by Pollitzer and Janowsky in the *International Atlas of Rare Skin Diseases*. Dr. Radcliffe Crocker gives an

excellent account of the disease in his textbook. In some of the reported cases the disease is associated with carcinoma of the abdominal viscera. This was apparently present in the following case; but as no *post-mortem* examination could be obtained, it was impossible to ascertain the situation of the primary carcinoma.

CASE.

X. Y., sugar boiler, aged 39; married; three children. Employed in sugar boiling for twenty years, and exposed to great heat in the course of his work. Out-patient at the Skin Hospital from August 15th, 1908, to October 5th, when he was made an in-patient. He was discharged at his own request on October 24th, and died at Bradford within a month.

The patient, whose life is thus briefly outlined, had good health until 1905, when he was in bed for six weeks with a severe attack of pneumonia on the left side. He recovered completely, and remained well until February, 1908, when he noticed a lump in his neck on the left side, just above the clavicle. In May, 1908, having increased in size in the meantime, it was removed at the Bradford Infirmary, under Dr. Basil Hall, who states that the glands were moderately enlarged, but scarcely worthy of the name of tumour. The Pathological Department reported that they were malignant. A deep pigmentation about the armpits was noticed. The operation wound healed normally. After the operation the patient noticed that his skin was rough and dark-coloured in parts, and that a number of warts made their appearance on the face, lips, and other parts of the body. He gradually lost strength, and entered the Skin Hospital on October 5th, as already stated.

State on Admission.

It was found that the general colour of the skin was a peculiar greyish-brown tint. No vascularity was visible on the cheeks.

On the face were a large number of warts, varying in size from projections that were just visible to flat filiform growths 5 mm. in height and about the same in diameter. The eyelids were much thickened, the external meati of the ears were filled with warty growths, and the nose, lips, and mucous membrane of the cheeks presented the same warty appearance; the tongue was clean; the skin of the neck was of a dark brown colour, almost black in parts; the left side was the darker, and presented a livid red scar, surrounded by swellings which were apparently enlarged glands. The pigmented skin was firm to the touch, thickened, but not markedly indurated. The axillae were deeply pigmented, and the skin of the body was sallow in tint, rather harsh to the touch, and dry. The groins presented a slight thickening of the skin and patches of brown pigmentation. The genitals were darkly pigmented, but both groins and genitals were less deep in colour, and less thickened than the neck and the axillae. The knees, legs, and feet were normal. The skin on the arms down to the wrists was normal in colour, but the hands and fingers presented a thickened papillomatous and pigmented skin. The pigmentation was most marked over the metacarpo-phalangeal joints, and over the interphalangeal joints. The skin of the hands was not cracked or fissured, and the patient could use them without pain. Though dry as a rule, the affected skin sometimes sweated freely.

The lungs were found to be moderately emphysematous, and there was some lack of resonance at the back, thought to be due to a thickened pleura from the previous attack of pneumonia. The heart was normal, pulse regular, temperature slightly subnormal, liver and spleen dullness normal, and there was no tenderness or pain in abdomen, nor anything abnormal on physical examination; the nervous system was also normal; the urine was dark-coloured and loaded with pink lithates. The blood count showed nothing distinctive, although there was a slight deficiency of small lymphocytes in favour of polymorphonuclears.

Progress and Treatment.

While in the hospital he had *x*-ray sittings three times a week, the scar and glands in the neck being exposed. Some diminution of size occurred. The skin of the neck exposed to the rays became of a coal-black colour, but the texture remained unaltered.

The patient gradually became weaker and his bronchitis worse, but there was no rise of temperature. The condition of the skin was unchanged when he left the hospital, after twenty-eight days' stay, to return home. No fresh symptoms occurred, but he lost strength and died, apparently from the bronchitis, a few weeks afterwards. No *post-mortem* examination was allowed.

Sections of the glands removed at the operation in May, 1908, on microscopical examination showed infiltration by a carcinomatous growth of a glandular type. While in hospital permission was obtained to remove a wart from the left ear, which caused some irritation, and the microscopical appearances of the serial sections agreed with those described in other cases—namely, great increase in the horny and prickle cell layers of the skin. The wart was not on a deeply pigmented part.

REMARKS.

There are several points of interest in this case; one is the association of the skin changes with the carcinoma of the left supraclavicular glands and the prior appearance of the latter. In the absence of any *post-mortem* examination it is impossible to say what organ was involved in this case, as there were no symptoms of disease in any abdominal viscus, but the probabilities seem to be in favour of the cardiac end of the stomach, where carcinoma may exist for a considerable time without localizing symptoms. The pancreas, however, cannot be excluded, and suprarenal disease is possible, although the condition of the blood seemed to be against it.

A second point of interest is the condition of the blood. At first sight any observer would have called the patient anaemic, save for the redness of the lips and the mucous membranes. Closer examination of the skin showed this appearance of anaemia to be due to the obscuration of the superficial blood-vessels by the opacity of the thickened skin. The blood-count showed only slight anaemia, and beyond the deficiency of red corpuscles the blood was practically normal within a few weeks of death. There was no marked leucocytosis.

Finally should be pointed out the predominance of the lesions on the upper half of the body and hands and the freedom from any sign of disease on the feet and legs below the thighs. In Janowsky's case exposure to great heat is mentioned as the apparent cause, and it is interesting to note that in his work as a sugar-boiler my patient was continually exposed to heat, and the hands and upper part of the body much more so than the lower part.

ACANTHOSIS NIGRICANS.

BY

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and G. MONCRIEFF MELVILLE, M.D.Edin., Late House Surgeon and House Physician, Royal Infirmary, Edinburgh.

[ABSTRACT.]

THE authors of this paper supplied a detailed review of the literature of this disease and demonstrated and described the following case, which has been under the observation of one of them since May, 1905, at the Thompson Memorial Home, Lisburn.

GENERAL HISTORY.

The patient was a woman, aged 42, who, up to the time of the commencement of her illness, had been in good health. At the age of 17 she had a child which died at birth. Her illness commenced with what was deemed to be a severe form of acid dyspepsia. Concurrently she noticed that menstruation was growing scanty, and it finally ceased, while an offensive leucorrhoea commenced. Her hair became brittle and began to fall, and her skin became discoloured, but it was not until about a year after the commencement of her illness that definite pigmentation was observed. It appeared first on parts normally exposed to light. Meantime warts and warty outgrowths began to make their appearance all over the body, especially on the face and hands. One large growth in the axilla began to discharge in about three months' time and decrease somewhat in size.

THE SKIN.

The face suggested that of a middle-aged rugged featured man. The normal lines were marked by black pigmentation; such pigmentation appeared in patches on the face, but otherwise the colouring was of a deep coffee hue, quite different from the bronzing of Addison's disease. The warts on the face and scalp were single and sessile, looking like enormously developed papillae. The ears showed some warting and pigmentation, but the lumen of the external meatus was not occluded. Under the semipendulous breasts there was deep blackening of the

skin and outgrowths between the skin surfaces somewhat like condylomata, though dry and scaly. In the right axilla is a pink cauliflower mass which discharges a fetid, straw-coloured fluid. It has round it a black circle of pigment, but otherwise is unpigmented. On first sight this growth looks like an ulcerating scirrhus, but on closer examination is seen to be in the skin, and not glandular. The bend of the elbow is pigmented, but few warts are visible in this situation. There are many on the hands, wrists, and fingers, while the skin between the latter is hypertrophied, and shows a dry, very typical scaliness. The feeling of the skin is very peculiar, it gives a sensation like that caused by rubbing rough textured plush velvet. The nails are dry, brittle, uneven, and cracked transversely.

On the abdomen the pigmentation is less well marked; but some of the darkest specimens of pigmentation may be seen round the gluteal region and natal fold, where there are good examples of pseudo-condylomata. There is also pigmentation on the front of the legs, and hypertrophied, scaly skin behind the knees. The state of the feet resembled that of the hands, though there were fewer warts. The iron-grey, scanty hair is short and dry, and almost as stiff as bristles.

The Mucous Membranes.

The tongue is dry, rough, and deeply furrowed, its mucous membrane and the soft palate of an orange tint and covered with outgrowths of the size of mustard seeds. The lips, deeply fissured, show a well-marked brown line at the junction of the skin and mucous membrane. In the pubic region, over which the hair has undergone changes of the same kind as elsewhere, there are a certain number of warts, and the lesser nymphae are somewhat hypertrophied, but the chief feature is the fetid leucorrhoeal discharge.

The Viscera.

The viscera reveal on examination no evidence of cancer or other abnormality, and the patient's appetite is fair. The urine shows no excess of pigment. The blood has been examined on several occasions, and at early examination a certain degree of lymphocytosis was indicated by the blood count; on all others it has been that of an ordinary healthy person.

Histology of the Skin.

Microscopically the skin shows papillomata with a connective tissue core and a covering of stratified epithelium, and there is no tendency whatever for the epidermis to invade the underlying corium. The connective tissue is made up of fibrillae with spindle-shaped cells. The tissues are well organized, and there is no round-celled infiltration. Scattered throughout it are discrete brownish quantities of pigment, mainly intercellular in position. The Malpighian layer of the epidermis is of normal thickness, but a few of its cells are pigmented. The basal layer is uniformly pigmented, and forms a well-marked line of demarcation between the epidermis and the cutis. There is so much pigment in the cells of this layer as to obscure the nuclei. The horny layer is thick, and when stained with haematoxylin and eosin appears light blue, whereas normal keratinized layer stains a deep red.

Treatment.

Numerous drugs were used without avail, but at last a combination of potass. iodidi gr. x and syr. trifolium (Parke Davis) ʒij, thrice daily, furnished good results. The dose was gradually increased up to 30 grains of the iodide of potassium and ʒss of the trifolium syrup. There was a gradual decrease in the size of the growths, especially marked in the case of the axillary tumour. However, at the end of ten months the improvement stopped, and a large cauliflower growth appeared in the left axilla, similar in size and appearance to that which was first observed in the right armpit; it was, however, much more darkly pigmented. Recently, calcium iodide gr. xv and salol gr. x once daily have been administered, ½ oz. of Epsom salts being given every third morning with the idea of removing any fermentation from the intestinal canal. This appears to have brought about a cessation of the progress of the disease, there being no increase in the papillomatosis or in the pigmentation. But although the condition appeared to become stationary, no other improvement can be recorded. Indeed, at the present time, the patient is on the whole losing ground. Her spirits are not as good as formerly, and increase in the pigmentation is recommencing.

General Observations.

With regard to the disease in general, the authors consider that both its etiology and its pathology are at present quite obscure. Cases completed by *post-mortem* examination are few, and none of the theories put forward by various authors apply equally to all the recorded cases. Women suffer more frequently than men, in the proportion of ten to three. The majority of cases are in people over 40 years of age, though instances of the disease in children as young as 7, and even 2 years old, have been noted. Abdominal cancer is held by some authors to be nearly always an associated factor. Traumatism of the abdominal sympathetic system has also been suggested as a cause, and by others exposure to extremes of heat and cold has been held accountable. In the authors' own case hyperchlorhydria was the only prodroma. Apart from the rarity of the condition, diagnosis is not difficult; the only condition for which it might be mistaken is Darier's disease, or keratosis vegetans, in which the enlarged papillae are quite different in appearance from the warty growths of acanthosis nigricans. Moreover, in Darier's disease the skin dryness is absent and the pigmentation less marked. Although the cases often last a long time, the prognosis must be regarded as bad, and there is no drug on which dependence can be placed for a cure. Apart from the treatment of symptoms and observance of general hygienic principles nothing can be done. The authors concluded their paper with the following bibliographic references:

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Unna (Norman Walker translation).

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

THE PREVENTIVE TREATMENT OF PUERPERAL ECLAMPSIA.

I believe the toxaemia in this disease to be of an acid character, from the success of the following treatment in twelve consecutive cases of albuminuria, varying in quantity from a half to fifteen-sixteenths of the total amount of the urine secreted; in one, my last case, I could actually turn the test tube on to its side without the contents leaving the tube, so thick was the deposit upon boiling and the addition of nitric acid.

I examine the urine in all cases of pregnancy at the seventh month. If this is not done, my experience has been to be called in when the patient is in convulsions, or, if the convulsive attack has temporarily passed off, when she is in a state of unconsciousness, from which, even with

the best consultative aid, the patient, in 50 per cent. of the cases, dies some time after delivery of the child without regaining consciousness.

If upon examination albumen is found, I order the patient to bed immediately, and keep her there until after confinement. The diet is principally milk; all other nitrogenous diet is forbidden. The preventive treatment is the use of potassium acetate (a neutral salt which becomes alkaline when taken) in sufficient doses to keep the urine alkaline.

My test of this is to boil the urine, and, if I get no deposit of albumen, I add nitric acid, and, if I then get a deposit of albumen, I keep the urine in this state. I then examine the urine every three days until labour sets in. From my experience of twelve consecutive cases, no convulsions will occur during labour or after delivery of the child.

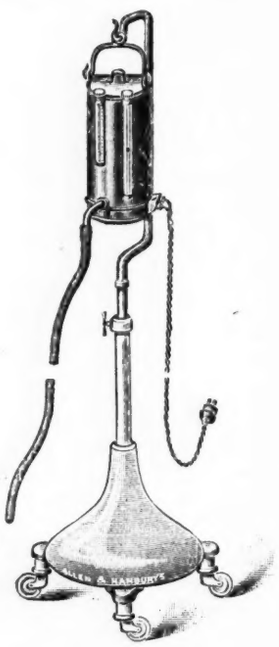
The potassium acetate does not cure the patient of her albuminuria—in fact, in many cases does not reduce the albumen at all—but it does prevent eclampsia.

I have not found it of any use in cases in which convulsions have actually begun, labour having set in, even if the patient recovers consciousness sufficiently to take the medicine.

Wolverhampton. ALEX. MILNE BANKIER, M.D.

NOTE ON CONTINUOUS PROCTOCLYSIS.

NOT the least important of the many good things which have come from America is the plan of the continuous administration of warm saline solution by the rectum, introduced by Dr. J. B. Murphy. This method of treatment is, in my opinion, one of the greatest advances in abdominal surgery which has been made within recent years. Its routine adoption leads, I believe, to more rapid and certainly to more comfortable convalescence after coeliotomy, and its beneficial effects in cases of general septic peritonitis would have surprised me had I not been prepared for them by hearing from Dr. Murphy's own lips of the wonderful results which he has obtained in the treatment of this serious condition since the adoption of the practice of continuous proctoclysis.



Success in using the Murphy method depends on attention to detail, and the two most important points are, first, the regulation of the flow from the supply can by gravity alone, and not by constriction of the delivery tube; and, secondly, the maintenance of the saline at a constant and appropriate temperature. To obviate the latter difficulty, I have had an apparatus made which does away with the necessity for constant supervision. It consists of an electro-plated douche can which holds about five pints. In the front of the can are a thermometer and a gauge glass, and the can is graduated in half-pints, so that the amount of saline entering the rectum can be readily estimated. The saline leaves the can through a delivery tube with a half-inch bore, to which is attached three feet of rubber tubing connected with a large rectal tube. Under the bottom of the can is an electric heater, which can be connected with any electric supply of suitable voltage by means of a flexible cord and wall plug. The can is suspended on an adjustable stand mounted on castors so that it can be readily wheeled up to the bedside. I have found by experiment that with a ward temperature of from 65° to 70° F. the solution in the can must be kept at a uniform temperature of 106° F. in order to ensure that the saline enters the rectum at a temperature of from 99° to 100° F. The electric heater is so made that if the saline solution is put into the can at a temperature of 106° F., the temperature remains almost constant so long as the current is switched on. The apparatus, which has been made for me by Messrs. Allen and Hanburys, can be left for several hours without any attention.

HERBERT J. PATERSON, M.B.,
London, W. B.C.Cantab., F.R.C.S.

SOAMIN (SODIUM PARA-AMINOPHENYLARSONATE) IN SYPHILIS.

ONE or two points of interest in regard to the action of a drug which is still on its trial is my excuse for bringing the following case to the notice of your readers.

J. B., aged 24, came to me in the end of 1908, having contracted syphilis three years previously. He consulted me concerning acute sloughing of his penis. The organ had been eaten away to within 2 in. of the pubis. Around the stump the skin was deeply ulcerated and the central portion embracing the urethra was one dark gangrenous slough. There was a copious, foul-smelling pustular discharge from the wound. I administered internally and locally the usual antisyphilitic remedies, but without improvement. By the end of February, 1909, the penis had disappeared and the stump was level with the pubis. The ulceration had spread somewhat over the scrotum. I stopped the treatment and proceeded to try soamin. I injected into the gluteal muscle 5 grains of soamin every alternate evening until 50 grains had been administered. I then increased the dose to 7½ grains every alternate evening until 120 grains had been given. The progress of the disease was just perceptibly slowed, but not being well pleased with the result, I put the patient on large doses of iron iodide and discontinued the soamin. A month later, in spite of the iodide, the disease showed signs of a fresh and more active lease of life. There was by this time a circular area of ulceration (taking the urethra as the centre) of from 2 to 3 in. in the suprapubic region of the abdominal wall and also over the scrotum. I then resumed the injection of soamin, beginning with 10 grains every alternate evening. An improvement was at once apparent, and, when 50 grains had been injected, healing of the ulcerated surface took place most rapidly from the scrotum upwards. By the time 100 grains had been administered the whole surface was completely filled up, firm, and solid, and has since remained so. On the second occasion 160 grains in all were given.

May I draw attention to the following points?

1. The dose of 5 grains or even 7½ grains was incapable of influencing the disease to any great extent, but the contrast was most marked and most rapid on adopting 10 grains.

2. In the literature on soamin that I have come across the value of the drug has been chiefly shown in syphilis in its earlier manifestations, especially in ulcerations of the mucous membrane of the mouth and throat. The case here recorded was a virulent type in the later stage uninfluenced by the usual antiluetic remedies.

3. With regard to the toxicity. There were no unpleasant symptoms during the first course of the treatment. But on resuming with 10 grains as the dose, after 50 grains had been given the patient complained of pain in his legs, especially in the back of his thighs and calves. This pain was limited to the days following each injection. The injection was usually administered about 8 p.m., and within eight or nine hours after each injection, that is, about 5 a.m., he suffered from severe epigastric pain and a feeling of nausea which passed off usually in about six hours.

After 70 grains had been given, on a further injection of 10 grains, he within an hour became faint and giddy, then cold and collapsed, and was obliged to lie down for several hours. On the reduction of the dose to 7½ grains no further untoward effects ensued.

Queen's Park, Manchester. ALEX. FRASER, M.D., C.M.

THE Emperor of Japan has conferred on Dr. Brander, of Fort William, the Sixth Order of the Sacred Treasure. After the Japanese-Chinese war Dr. Brander was also decorated by the late Emperor of China with the Third Order of the Double Dragon for distinguished medical services to the Chinese wounded soldiers from Korea.

Reports
ON
MEDICAL AND SURGICAL PRACTICE IN THE HOSPITALS AND ASYLUMS OF THE BRITISH EMPIRE.

KING EDWARD VII HOSPITAL, WINDSOR.

CASE OF HERNIA OF VERMIFORM APPENDIX.

(By E. T. Norris, M.A., M.B.Cantab., Senior Surgeon.)

The patient in the following case, a married woman, aged 36, was seized with sharp pain in the right groin at 11 a.m. on June 8th, 1909. At about 1 p.m. the bowels acted naturally. The pain, though severe, was not bad enough to prevent her walking to a neighbouring town three miles distant the same afternoon, and she also accomplished the journey home on foot, though apparently suffering a good deal. She felt a lump in the right groin when she undressed for bed, and, the pain being no better, she sent for her medical man, and was seen at 11 p.m. There was a painful fluctuating swelling, irreducible, about the size of a small hen's egg, in the right groin. There had been no vomiting, and she did not look ill. She said that she was sure that no swelling existed there before.

Operation.—The following day she was moved to hospital, and I operated upon her at 2 p.m. The femoral sac was a fluctuating swelling, and contained dark blood-stained fluid. The sole remaining content of the sac consisted of the tip of the appendix, about the size of a finger-nail, which being tightly strangulated at the femoral ring was black and to all appearances gangrenous, but proved not to be. The femoral ring was incised, and the appendix drawn out and an inch removed; the stump was returned into the abdomen.

Result.—The after-history was uneventful, recovery being rapid and complete.

In a paper by Mr. McAdam Eccles, in vol. xxxii of *St. Bartholomew's Hospital Reports*, I find some similar cases published.

The notes of the case were kindly taken by Dr. Elgood, Windsor.

Rebiews.

HAEMODYNAMICS.

Dr. Johann Plesch has worked out in the laboratory of Professor v. Zuntz of Berlin measurements of the amount of blood and haemoglobin in the body, the volume of the output of the heart per minute and per beat, the circulation time, the velocity of blood flow, and the work of the heart.[1] These measurements, applied as they are to normal men and to cases of anaemia, heart disease, kidney disease, and exophthalmic goitre have yielded results of very great interest, and may be accepted with considerable confidence, as they have been arrived at by exact physiological methods and under the guidance of Professor Zuntz, who is one of the first authorities—if not, indeed, the first—in Europe on respiratory problems. The determinations of blood volume, haemoglobin content, and oxygen capacity of the blood have been carried out by Haldane's method, which depends on the inhalation of a small and non-toxic quantity of carbon monoxide of known volume, and the determination of the percentage of CO haemoglobin in a blood sample taken from the finger of the subject. From the total amount of CO absorbed and the amount found by a calorimetric method in the measured sample of blood the total amount of blood in the body is arrived at. By means of a haemoglobinometer containing a standard solution of CO haemoglobin (the oxygen capacity of which was determined by Haldane's method of displacing the oxygen by ferricyanide) the oxygen capacity and percentage of haemoglobin are measured. Dr. Plesch uses a modification of Barcroft's blood gas analysis apparatus, and determines the CO in the blood not only calorimetrically, but by displacing it with with ferricyanide, burning it into CO_2 by means of an incandescent spiral, and measuring the volume of CO_2 so produced. The saturation of the haemoglobin to one-third of its capacity with CO is said to be quite harmless. The absorption of 150 to 170 c.cm. CO by a man of 70 kg. weight produces, according to Dr. Plesch, no symptoms. Some unpleasant results, however, were met with, we believe, by Professor Lorrain Smith during the course of an inquiry into the blood volume of various cases of anaemia.

The presence or absence of salts (Barcroft), just as the presence of more or less CO_2 (Behr), modifies the dissociation curve of an oxyhaemoglobin solution in a marked manner. It is almost certain, therefore, that the presence of CO also modifies the dissociation curve. The taking up of CO in the lungs by the undiluted blood may be, and probably is, different to the taking up of CO by blood diluted *in vitro* with water to 1 in 100. The determination of oxygen tension in the blood made by Haldane's method will probably require considerable modifications in the light of the recent results which Barcroft communicated to the Oxford meeting of the Physiological Society. The exchange of oxygen between blood and lungs, which, according to Haldane and Lorrain Smith, does not follow the physical laws of diffusion, may yet be found to do so by the CO method when its effect on the dissociation curve has been allowed for. All other evidence is in favour of the exchange in the lungs being a simple physical process, and Haldane and Behr, alone among eminent physiologists, assert that oxygen is forced in and carbonic acid out by a vital secretory process of the pulmonary epithelium. We do not see, however, that Barcroft's results can modify the determinations of blood volume by the CO method, and no error comes to light in Dr. Plesch's careful analysis of this method. He has employed another method as a control—namely, that of injecting a measured quantity of isotonic salt solution into a vein, and determining the variation in the haemoglobin percentage so produced. The accuracy of this method, he says, depends on the exact isotony of the solution used, for this, he says, prevents the salt solution leaving the blood. Dr. Plesch does not give any convincing proof that the isotonic salt solution does not leave the blood in the interval between its injection and the collection of the blood sample, but his results show a surprising agreement with those obtained by the CO method.

He agrees with Haldane in estimating the blood volume as 5.3 per cent. or one-nineteenth of the body weight—less in fat people. The haemoglobin he estimates at 0.70 per cent. of the body weight, the total oxygen capacity of the blood as 10 c.cm. per kg. of body weight. The blood volume is diminished after repeated and severe haemorrhages, is increased up to twice its normal value in chloresis (confirming Lorrain Smith) and in nephritis without oedema. Dr. Plesch determined the minute volume of the heart by the method of Zuntz, that is, by arriving at the following factors: the oxygen content of the arterial blood, the oxygen content of the venous blood, and the oxygen use of the body per minute. The first factor is obtained from the alveolar tension of oxygen of the subject and the dissociation curve of haemoglobin. The alveolar oxygen tension can be measured easily by Haldane and Priestley's method, or calculated from the composition of the expired air and the known average volume of the dead space in the air tubes. The oxygen in the venous blood is got at in a very ingenious way. The subject breathes in and out of a 10l. bag of pure nitrogen for two breaths. This is to wash most of the oxygen out of the lungs. He then breathes in and out of a small bag (3l.) for ten to fifteen seconds. The contents of the small bag then represent the composition of the alveolar air, and the oxygen tension of this air will be in equilibrium with that in the venous blood. From the tension the volume of oxygen in the venous blood can be calculated. The whole experiment, lasting fifteen to twenty-five seconds, is quite harmless, and can easily be carried out with a subject of some intelligence. Dr. Plesch finds on the average (few cases have been done) the following figures:

Oxygen in Arterial Blood.	Oxygen in Venous Blood.	
18.76	12.9	Normal.
6.99	4.95	Pernicious anaemia.
15.71	8.78	Nephritis.

[1] *Hämodynamische Studien.* By Dr. Johann Plesch. Berlin: August Hirschwald. 1909. (Sup. roy. 8vo, pp. 245, illustrations 16. M. 7.)

The oxygen use per minute can be determined by Zuntz's method of breathing through a meter and collecting and analysing a sample of expired air continuously collected by the rotation of the meter. The determinations have to be made successively, but it is arranged that the patient remains in a resting posture and under the same conditions. The minute volume obviously can be reckoned if we know the volume of oxygen taken up per minute from the lungs, and the difference between the oxygen content of the venous and arterial blood. The heart-beat volume is got by dividing the minute volume by the number of pulses per minute. The circulation time is got from the total volume of blood and the minute volume. The work of the left ventricle is got from the minute volume and the mean arterial blood pressure. The right ventricle may be taken as doing one-third the work of the left. The velocity of blood flow can be got from the heart-beat volume, if we know the time spent in outflow, and the average cross-sectional area of the aorta. The outflow time can be calculated from known data, and from a pulse tracing. It is somewhat astonishing to realize that all these determinations can be arrived at by such simple and harmless means on a normal man. The average minute volume in normal man (70 kg.) is found by Dr. Plesch to be 4.3 l. or 62 c.cm. per kilogram. In the greatest work it may rise to 47 l. The heart beat volume is 59 c.cm., and may rise to 240 c.cm. The velocity of flow is 42 cm. per sec., and may rise to 200 cm.; the circulation time is 55 sec., or 65 pulse beats, and may fall to 4½ sec. in the greatest work. The work of the heart per minute is in rest 9.27 m. kg., and may rise to 100. In anaemia the minute volume is much greater, but smaller in nephritis. The velocity of flow is much greater in anaemia, and hence the murmurs heard over the heart in these cases. The work of the heart is increased in Graves's disease, and in nephritis with high arterial pressure. Such are some of the conclusions of this interesting research.

VARIATION, HEREDITY, AND EVOLUTION.

THE necessity for the production of a second edition of Mr. R. H. LOCK'S book on *Variation, Heredity, and Evolution*[2] at so short an interval as three years after the appearance of the first, which was twice reprinted, is in itself a proof that the book has satisfactorily filled a vacant place in the literature of modern science. Mr. Lock has brought this new edition thoroughly up to date, not merely by amplifying the subjects formerly dealt with, but by the insertion of much new material, including an entirely new chapter on eugenics and by the addition of a short but useful bibliography. The author's scientific work and attainments are such as would lead to the expectation of good material in a book dealing with subjects of such vital and increasing importance to the whole community, and those who read the present work will not be disappointed. It is an admirable summary of the subject, well and lucidly written.

The inclusion of a chapter on eugenics is most useful, and will enhance the value of the volume, since every advance in sociology, to be of any real and permanent advantage, must be based upon the teachings of this branch of modern science. "Modern civilization and humanitarianism have effectually set aside the action of natural selection," and all efforts to bring about race improvement by legislation and by a saner public opinion must have their foundations laid upon sound eugenic principles. The difficulty at present lies in the practical application of those principles. Professor Biffen and Mr. Walter Heape (the latter in his book on *The Breeding Industry*) have shown the importance of the adoption of scientific data by the agriculturist and the cattle breeder; and though it is recognized that the human race cannot be run "on the principles of the stud farm," it has been shown that Mendelian laws are probably as applicable to certain disorders of the nervous system and other organs as to the tallness or shortness of sweet peas. Whatever may be the individual judgement in the Mendelian controversy, we cannot but admire the eminently impartial manner in which Mr. Lock has set forth both sides. The aims of the biometrician and the breeder are the same though the methods differ. The arguments of the latter are always likely to attract greater attention, as they appear to the uninitiated to have more practical bearing and are much more easily understood. It is but natural, therefore, that more space should be devoted to that aspect of the problem. The evidence upon which the biometrician bases his conclusions lies in regions of mathematics beyond the ken of the average person, but the author has made a heroic attempt to explain this very difficult subject in an understandable manner. He has succeeded to a degree to which few other writers could have been able to attain. The chapter on recent cytology is excellent. Reference is made to the bearings of cytology and Mendelism on the intensely fascinating problems of sex-production and sex-heredity. In conclusion it may be said that this is a sound, readable, and reliable work, which will well repay perusal. We can only hope that Mr. Lock will find time to continue the production of new editions in order to keep his readers abreast of new facts and inferences

[2] *Variation, Heredity, and Evolution.* By R. H. Lock, M.A., Fellow of Gonville and Caius College, Cambridge; Assistant Director of the Royal Botanic Gardens, Peradenia, Ceylon. Second edition. London: John Murray. 1909. (Post 8vo, pp. 348. 5s.)

SEXUAL PSYCHOLOGY.

"IN letzter Reihe ist der Mann. ist das Weib, was seine Geschlechtsdrüsen sind" wrote Arndt in his textbook of psychiatry. Although this is a manifest exaggeration of the truth, there can be no doubt that the reproductive instinct is one of the deepest and most potent springs of conduct; second, perhaps, only to that of self-preservation. The study of abnormal forms of sexual gratification, therefore, should throw considerable light on the psychophysical constitution of the subjects exhibiting these abnormalities, and should result in practical gains, such as a knowledge of the connexions, if any, between definite types of abnormality and specific types of nervous disorder; therapeutic and prophylactic principles; and, finally, these should bring in their train the doubtless much-needed alterations in the judicial view and disposal of such cases. But a mere account of sexual anomalies, however carefully arranged and classified, such as is contained in Dr. GEORG MERZBACH'S volume,[3] and particularly, as in this case, when mainly composed of detailed descriptions of particular examples, has at best a purely documentary value, and at worst becomes a veritable pornographic calendar.

A book of a very different character on sexual life and nervous disease,[4] by Dr. L. LÖWENFELD of Munich, was first published in 1891. It is now in its fourth edition and has grown to considerable size. It is composed of seventeen chapters, only one of which is directly concerned with the anomalies of sexual desire, and even in this chapter a wise reticence is observed as to non-essential details. Another chapter is supplied by Professor Freud of Vienna, describing his well-known theories concerning the sexual causation of the neuroses and psychoneuroses. In the remaining chapters the whole matter of sexual life, so far as this has a bearing on the causation of nervous disorders—the physiological and pathological effects of puberty, child-bearing, and the climacteric, onanism, and anticonceptional measures, particularly the *congressus interruptus*, to which Professor Löwenfeld attaches great importance as one of the most fertile causes of neurasthenia—are all ably discussed in scientific and calmly dispassionate fashion. In the last, and perhaps the most valuable, chapter of the book prophylaxis and treatment are considered, and the many and varied forms of treatment of sexual neurasthenia which have been advanced in America and the Continent critically examined. We can cordially commend this book as an interesting, well-informed, and thoroughly reliable guide through somewhat difficult country.

In the two books mentioned above, sexual functions, whether perverse or not, are considered either as being in themselves or as occasioning morbid processes. In a recently issued reprint from the valuable series of *Juristisch-psychiatrische Grenzfragen*, edited by Professors Finger,

[3] *Die krankhaften Erscheinungen des Geschlechtssinnes.* By Dr. Georg Merzbach. Vienna and Leipzig: Alfred Hölder. 1909. (Cr. 8vo, pp. 478. M. 5.20.)

[4] *Sexuelleben und Nervenleiden; Die nervösen Störungen sexuellen Ursprungs.* By Dr. L. Löwenfeld. Wiesbaden: J. F. Bergmann. 1906. (Roy. 8vo, pp. 404. 7s.)

Hoche, and Bresler, upon the influence of sexual functions upon female criminality,[5] Dr. SIEGFRIED WEINBERG—a doctor of law, not of medicine—limits his discussion to the questions of what influence the normal organic changes of puberty, child-bearing, and the menopause have upon female criminality. Dr. Weinberg's paper is partly a review of the literature bearing upon this point, and for the remainder a purely statistical study. Although he has not satisfactorily eliminated or even considered factors, apart from sexual functions, which may have weighed in producing results which he deduces from official figures, the figures are interesting. Briefly, by means of statistics—not only those of Germany but also from the official publications of Austria and Italy—he shows that at the age periods 12 to 15, 20 to 30, and 40 to 50 there are very considerable increases in female convictions, coinciding with the most general periods of puberty, most numerous pregnancies, and most usual incidence of the climacteric. Further, although unable to bring documentary evidence in favour of the great influences of menstrual periods in conducing to female criminality, the author quotes several authorities in support of this contention, and regards with approval the conclusions of Krafft-Ebing to the effect that the mental integrity of the menstruating woman is forensically questionable; that in such cases a mental examination should be made, and that, even when a menstrual psychosis is not provable, punishment should be mitigated. Dr. Weinberg is of the opinion that because of judicial ignorance or neglect of the influence of these normal processes on female conduct injustice is often done. This may possibly be true; but it is not, as Dr. Weinberg appears to contend, because every menstruating or gravid or involuting woman is more or less mentally unbalanced, but because insufficient care is taken to eliminate the presence of actual though it may be transitory psychoses in the accused persons.

WATER SUPPLY AND SEWAGE DISPOSAL.

THE eleventh volume of contributions from the Berlin institute for investigating questions relating to water supply and sewage disposal[6] is devoted to a report by Dr. A. SCHIELE on the disposal of trade effluents and of sewage containing trade refuse. A similar report by Bredtschneider and Thumm formed the third volume of these publications (see this JOURNAL, October 29th, 1904, p. 1175), and the two reports are especially interesting to English readers from the fact that they are both based upon information obtained in this country. The intervening volumes have contained much valuable information contributed by the scientfic workers of the institute and others.

In the preface we are informed that the volume is the outcome of a visit paid to this country towards the end of 1905 by the author and Professor Thumm at the joint instigation of the above institute and the association for water supply and sewage disposal, with means found by the latter. This association pays an annual contribution to the funds of the institute, and in return suggests subjects for investigation. Although the institute is conducted on lines similar to the "central authority" recommended for this country by the Royal Commissioners on Sewage Disposal and Salmon Fisheries, it carries out work upon payment for associations, local authorities, and private individuals, and the Governments of Bavaria and Würtemberg have lately inaugurated similar institutions, corresponding somewhat with the American State Boards of Health. Nearly four years have elapsed since the visit of the author, but the work has been brought up to date by the inclusion of information obtained from official sources. It is not a mere description of the tour, but a compendium of what is known of the problem of trade refuse disposal, and deals more with technical than purely scientific aspects of the question. Such information is not easily accessible, for it is largely contained in blue books and in reports to local authorities which have not the wide circulation the present volume will, it is to be hoped, attain.

Part I (pp. 3–130) is devoted to the historical aspect of the subject and general considerations which distinguish England from Germany, such as volume of rivers, rapid development of industrial districts, and legal enactments. The labours of the various Royal Commissions, the Local Government Board, and of local joint committees (rivers boards), are given in detail. It is stated that there is a tendency on the part of manufacturers to discharge their trade refuse into the sewers of the local authority, and that the most varied treatment is meted out to the manufacturer by the local authority. In some districts the local authority receives the trade refuse without payment or preliminary treatment, whilst in others these are insisted upon, and the Reports of the Royal Commission on Sewage Disposal are cited to show that a change in the law is necessary.

Part II (pp. 131–392) contains very full descriptions of the fifteen sewage works visited. The works visited included Blackburn, Bradford, Devizes, Hanley, Leeds, Manchester, Rochdale, and Salford, and the works of twenty-eight other towns, including Birmingham, Burton-on-Trent, Halifax, Huddersfield, Leicester, Rothwell, Sheffield, Trowbridge, and Yeovil, are described from reliable sources. The works for the purification of trade refuse visited dealt with the woollen industry, bleaching, dyeing, calico printing, paper works, and breweries.

The general conclusions to be drawn from the information obtained are given in Part III (pp. 393–816) which deals with the refuse from textile factories, paper works, breweries, tanneries (only in conjunction with domestic sewage), coal washing, gas and coke works, cellulose factories, chemical works, metal-working industries, and sugar works. Each industry is dealt with separately. The processes giving rise to polluting liquids are described at length, and then the general methods applicable for their purification are described. A very important part of this section is concerned with the various methods of distribution which have been tried at sewage works, and another part is devoted to the sludge question. Details are given of experiments carried out in this country and in Germany to burn sludge, either obtained from the Rothe-Degener process or from ordinary processes and then mixed with coal, and also to gasify sewage sludge. In discussing the question of cost of sewage purification and making a comparison between Germany and this country the author comes to the conclusion that although the cost of food, rent, heating, and clothing, is lower in this country, the total cost of sewage treatment is, on an average, the same. The information as to the cost of treating trade refuse is very scanty. Even with the data at the author's disposal the figures are very variable, but stress is laid upon the fact that it is cheaper to design and construct works at the time the factory is built than to add these afterwards at perhaps great inconvenience. The author insists upon careful management of works and upon the very great value of keeping a daily record of flow, purification, etc. He concludes that it is, generally speaking, better to treat trade refuse along with sewage, and that manufacturers are regarding this as the best solution of their difficulty.

In Appendix I the English legal enactments are traced historically and are classed in three periods. During the first period (1842-1857) it was regarded as preferable to carry sewage into streams rather than allow it to accumulate in the neighbourhood of dwellings, solids being first removed. The second period (1858-1870) may be termed the era of utilization of sewage on land, whilst the third period, from 1870 to the present time, is characterized by developments of Frankland's intermittent filtration, culminating in present-day biological methods, by more attention to rivers pollution, and by the formation of rivers boards. Two other appendices contain the regulations which have been formulated in various English and German towns for the admission of trade refuse to sewers. The book is furnished with very complete and useful indexes, arranged under the headings of subject matter, place names, and authors names.

[5] *Uber den Einfluss der Geschlechtsfunktionen auf die weibliche Kriminalität.* By Dr. jur. Siegfried Weinberg. (Reprinted from the *Jur.-psych. Grenzfragen*, Bd. vi, Heft. 1.) Halle a S.: Carl Marhold. 1907. (Med. 8vo, pp. 34. M.1.)

[6] *Mitteilungen aus der Königlichen Prüfungsanstalt für Wasserversorgung und Abwasserbeseitigung zu Berlin*, vol. xi. *Abwasserbeseitigung von Gewerben und gewerbereichen Städten unter hauptsächlicher Berücksichtigung Englands.* By Dr. Albert Schiele. Berlin: August Hirschwald. 1909. (Roy. 8vo, pp. 960. 179 illustrations and plans. M.24.)

NOTES ON BOOKS.

IT would appear from the preface of the last number of the *Archives of the Middlesex Hospital*[1] that this publication will in future appear in a double series. The one, of which the new number is an example, consists of clinical reports; the other will deal with the special work of the Cancer Department. The latter will be produced under the direction of the Cancer Investigation Committee, while the editors of the clinical reports are Mr. Sampson Handley and Dr. Victor Bonney. The fasciculus now issued comprises some sixty pages, and contains a set of papers, for the most part clinical, although one, the last, by Mr. Sampson Handley himself, is mainly pathological. It gives an account of the nature and structure of De Morgan's spots, which are supposed to be indicative of cancer, or, at any rate, to occur more frequently in patients so affected than in non-cancerous persons. Mr. Sampson Handley's microscopical investigations show that the spots, which are of the nature of small naevi, are phenomena of senile atrophic degeneration of the skin, and that they are due to the invasion of the epithelial layer by connective tissue; a curious inversion, as Mr. Handley points out, is the process which produces the epithelioma of the skin; the connective tissue after a time becomes vascularized, and the capillary vessels undergo marked ectasis. The fully developed spot consists, in fact, of a mass of dilated capillary vessels with a network of supporting connective tissue. Mr. Handley would bring the condition into relation with the degenerative changes occurring in the skin in old age, to which Mr. Lenthal Cheatle in the paper published in the BRITISH MEDICAL JOURNAL, 1909, vol. i, p. 1411) applied the term "biotripsis," or life-wear. Mr. Handley believes that it will be found that the spots occur more frequently and in greatest number about the umbilicus, and are relatively rare upon the limbs. The first paper in the volume is a short note illustrated by a pencil drawing made by the late Mr. T. W. Nunn, consulting surgeon to the hospital, of a case of gunshot wound of the hand received at the battle of Corunna in 1809. The drawing was made in 1847, and is interesting as affording a curious link with the past.

The importance of dieting in Indian maladies fully justifies Mrs. BYRDE and Miss PEARSON, who have already published several pamphlets on Indian cooking, in adding *A Handbook of Cookery for the Sickroom*[2] to the series. The work is divided into three parts, Part I treating of invalid drinks, Part II of food for convalescents, and Part III of light sweet dishes. The directions for preparing the various articles included under these heads are plain and practical, and the materials recommended are easily procurable in India. Some of the recipes, such as shinai misri, bael drink, issup-gol, mangosteen tea, and tamarind drink, are peculiarly oriental, and are used with advantage in the treatment of dysentery. The preparation of oatmeal gruel, plain and peptonized, is described, but that of oatmeal porridge, which requires careful cooking, and is often relished by convalescents, is omitted. We have also failed to find mention of *pish-pash* (chicken and rice) which is a favourite food for infants in health and sickness in India.

The issue for June of the *Proceedings of the Royal Society of Medicine* is the penultimate fasciculus of the second volume which will appear in October. This fasciculus covers one or more meetings of the eleven sections of the society, and most of the papers which it contains have already either been noticed or published in this JOURNAL. The one which demands the most serious study is the elaborate review by Mr. H. J. Paterson of cases in which jejunal ulcer has followed gastro-jejunostomy. He places the probability of this occurrence in any given case at 1 in 50, and goes deeply into its etiology. The expenses of the investigation in which the paper finds a basis were defrayed by a grant from the British Medical Association.

The Cape of Good Hope (Western Province) Branch of the British Medical Association, like the majority of its congeners, does not publish volumes of transactions, but the happy thought occurred to Dr. LÜCKHOFF that the addresses of its presidents might well be preserved. He has, therefore, published as many of them as could be collected under the title of *Presidential Addresses*.[3] There are fourteen in all, and the compilation is of interest, inasmuch as it throws a sidelight on the course of medical thought in South Africa. As far back as 1888 we find Dr. Charles Murray calling upon his fellows to head a crusade against alcoholism, and in the year following giving convincing reasons for the establishment of a health department. In point of permanent interest the palm must be awarded to the two addresses delivered by Dr. J. H. Meiring Beck, dealing as they do with the history of medical work at the Cape. The existing Branch of the British Medical Association only came into existence some twenty years ago, and the South African Medical Association, which it replaced only some five years earlier. Long before this, however, in the second decade of the nineteenth century, there came into existence and flourished for nearly thirty years a very successful medical society, of which a certain number of records are still in existence.

The precise object and intention of *Children of the Poor*,[4] by Dr. A. D. EDWARDS, is not quite clear, but since this little volume has been written, it may be safely commended to all lovers of children; likewise to all those whom the recent legislation either pleases or displeases. It contains as clever a series of pen pictures of child life as we have seen for a long time. Most of them serve to illustrate the advantages of measures which have come into existence during the past few years, and which, whether that be their first intention or otherwise, tend to improve the conditions in which the children of the poor commonly live. In all the fights which have brought about these reforms, this JOURNAL can claim to have played its part, and to those disposed to demand already further legislation, it may be suggested that they should ask themselves whether they really go quite far enough back in their premisses. Every one will concede that it is the birthright of children to be saved, as far as may be, from suffering for the sins of their parents; but it may be asked whether the preventable sufferings of children can entirely be prevented so long as men and women, however unfit to be parents, however debased their lives, remain free to propagate as many children as they please?

[1] London: Macmillan and Co. 1909.
[2] *Invalid Cookery: A Handbook of Cookery for the Sickroom.* By Mrs. Byrde and Miss Pearson. Calcutta: Thacker, Spink and Co., and London: W. Thacker and Co. (Cr. 8vo, pp. 48. 1 rupee or 1s. 6d.)
[3] Capetown: Townshend, Taylor and Snashall.
[4] *Children of the Poor.* By A. D. Edwards, M.B., B.S.Lond., B.Sc., D.P.H. London: Hammond, Hammond and Co. 1909. (Cr. 8vo, pp. 74. 1s.)

MEDICINAL AND DIETETIC ARTICLES.

"Vindevie" Grape Juice.

UNFERMENTED grape juice appears to be increasing in favour as a beverage, and has certainly much to recommend it. Messrs. Schweppes, Limited, have submitted for examination samples of their "Vindevie," which is a preparation of this nature. Our analysis shows that 100 parts by measure contain a total of 17.1 parts of solids, of which 15.5 consist of grape sugar and 0.3 of ash; the acidity is equivalent to 0.9 part of tartaric acid, and examination of the ash showed that about one-fourth of this is present as acid potassium tartrate. The preparation is described as non-alcoholic, and it is stated that no preservatives are used. Our analysis showed these statements to be correct, formaldehyde, salicylic, benzoic, and sulphurous acids and other preservatives, as well as alcohol, being absent. This grape juice is exceedingly palatable, and makes a refreshing and healthful beverage either alone or mixed with effervescing waters.

THE fifth International Dental Congress was opened in Berlin on August 23rd, under the presidency of Professor Walkhoff, Professor of Dental Surgery in the University of Munich. The congress was welcomed by Professor Waldeyer, Director of the Anatomical Institute in the University of Berlin. The congress is meeting in the Reichstag buildings, where a large exhibition of dental specimens and appliances has been brought together.

MESSRS. SIEMENS BROTHERS AND CO., LIMITED, of Caxton House, Westminster, have issued two supplements to their 1908 catalogue. From one of these we learn that the present market price of pure bromide of radium is £16,000 per gram, strictly net. By arrangement with the Banque du Radium of Paris, of which Messrs. Siemens are the sole agents in this country, the costly substance may, however, be hired by the day at a certain cost per centigram. Particulars are also given of the supply of radio-active earths, either for treatment by means of baths or, when made into a suitable pad, for local application. The other supplement describes the clinical temperature-recording outfit shown by this firm at the recent annual meeting of the British Medical Association.

DIETS FOR CHILDREN'S HOMES.

A correspondent wrote to us recently asking whether the following diet, which he states to be used at an orphan home for girls of ages from 4 to 17 years, is adequate:

Breakfast.

8 a.m.—Milk and water and bread and dripping.

Dinner.

Monday.—Vegetable soup only.
Tuesday.—Pea soup only.
Wednesday.—Suet pudding and treacle only.
Thursday.—Bread and cheese only.
Friday.—Rice pudding only.
Saturday.—Fried fish (bought cooked from a shop).
Sunday.—Bread pudding only.

Tea.

4 p.m.—Cocoa nibs and bread and dripping.

Supper.

None.

Our correspondent does not mention the quantities of the materials used for making the soups, and it would no doubt be possible to sustain life upon a sufficient quantity of bread and dripping and milk and water and the other unappetizing dishes mentioned, but it is quite certain that this dietary is altogether inappropriate, and, if correctly stated, reflects no credit upon the common sense of the benevolent persons who maintain and administer the home.

The whole subject of diet is still in the empirical stage, and the uncertainty which surrounds it has been materially increased by the results of the recent researches of Chittenden and his colleagues. It seemed worth while, therefore, to make a few inquiries to ascertain the diet empirically arrived at by persons who, not unduly trammelled by financial considerations, desire to do their best in the matter of food by children under their care.

In the first place, having recently had an opportunity of inspecting the remarkably interesting convalescent and surgical home at Baschurch, in Shropshire, founded and administered by Miss Hunt, we applied to that lady for her views of the diet quoted above; she has kindly expressed them with a degree of force and directness which precludes us from quoting them at length, but the nature of her opinions may be gathered from the fact that the diet she herself gives in the home mentioned, most of the inmates of which are children, is as follows:

Breakfast.

Porridge with new milk; or sausages; or eggs; or fried eggs; or liver and bacon; or cold ham; or dried fish.

Dinner.

Monday.—Cold beef and lamb; mince for little ones; potatoes, salad, pickles; milk pudding, pastry, or stewed fruit.
Tuesday.—Irish stew with carrots and onions; suet pudding, milk pudding.
Wednesday.—Roast mutton or lamb, mint sauce; mince for little ones; potatoes, cauliflower, Genoese paste sandwiches; milk pudding.
Thursday.—Rabbit or veal pie, cabbage; open tarts, milk pudding.
Friday.—Fish; beans and bacon; or stew; pastry, stewed fruit, milk pudding.
Saturday.—Cold meat; mince for little ones; mint sauce, salad, pickles; cornflour shapes with jam; cheese.
Sunday.—Roast beef; mince for little ones with plenty of gravy; peas and new potatoes; fruit tart, or stewed fruit with milk; milk pudding.

Tea.

Tea or new milk; bread and butter and lettuce, or raw onions; or jam; or cake.

Supper.

Cold meat and cold milk pudding; milk; bread and butter; or dripping; or jam; or soup.

This diet scheme probably errs on the side of excess; this is the view expressed by a gentleman who has had long experience in the conduct of preparatory schools for the upper classes, where young boys from 8 to 13 or 14 are received. The diet which he found satisfactory was as follows:

Breakfast.

8 a.m.—Porridge and milk; eggs; or bacon fried or cold; or sausage; fish twice a week (generally fresh).
11 a.m.—Milk and biscuits.

Dinner.

1 p.m.—Joint, hot or cold; potatoes; vegetables or salad; tart; or suet pudding with treacle or jam; or a fruit pudding; or milk pudding.

Tea.

6 p.m.—Bread and butter and jam; or cake.

Bed-time.

Milk and biscuits.

INSECTS AND DISEASE.

Appointment of an African Entomological Research Committee.

In view of the intimate relation which is recognized as existing between certain insects and the propagation of diseases of both man and animals in tropical Africa, and of the similar relation between insects and economic plants which is becoming more evident as settlement in the continent progresses, the Earl of Crewe has appointed a scientific committee, whose object it will be to further the study of economic entomology, with special reference to Africa.

This body will be known as the African Entomological Research Committee, and the Earl of Cromer has kindly consented to act as chairman. The other members of the committee are:

Colonel A. Alcock, C.I.E., F.R.S., of the London School of Tropical Medicine.
Mr. E. E. Austen, of the Natural History Museum.
Dr. A. G. Bagshawe, Director of the Sleeping Sickness Bureau.
Dr. J. Rose Bradford, F.R.S., Secretary of the Royal Society.
Colonel Sir David Bruce, C.B., F.R.S.
Dr. S. F. Harmer, F.R.S., Keeper of Zoology, British Museum (Natural History).
Dr. R. Stewart MacDougall, Entomological Adviser to the Board of Agriculture.
Sir John McFadyean, Royal Veterinary College.
Sir Patrick Manson, K.C.M.G., F.R.S.
Mr. R. Newstead, of the Liverpool School of Tropical Medicine.
Dr. G. F. Nuttall, F.R.S., Quick Professor of Biology, Cambridge University.
Professor E. B. Poulton, F.R.S., Hope Professor of Zoology, Oxford.
Lieutenant-Colonel D. Prain, C.I.E., F.R.S., Director of the Royal Botanic Gardens, Kew.
Mr. H. J. Read, C.M.G., representing the Colonial Office.
The Hon. N. C. Rothschild.
Dr. D. Sharp, F.R.S.
Dr. A. E. Shipley, F.R.S., Cambridge University.
Mr. S. Stockman, Chief Veterinary Officer to the Board of Agriculture.
Mr. F. V. Theobald, of the Agricultural College, Wye.
Mr. C. Warburton, Cambridge University.
Mr. A. C. C. Parkinson, of the Colonial Office, is acting as Secretary to the Committee, and Mr. Guy A. K. Marshall as Scientific Secretary.

Arrangements are now being made to dispatch a trained entomologist to the east side of tropical Africa and another to the west for the purpose of stimulating official and other residents to collect and observe noxious insects, and of affording instruction in the use of scientific methods. By this means it is hoped to obtain throughout these territories an organized body of investigators who will communicate all their collections and observations to the Committee. These collections will be classified by a number of British, and, in some instances, Continental entomologists, and named specimens will be distributed to such institutions as may require them for purposes of instruction, both at home and in Africa. The Committee will also keep in touch with the work which is being done in this branch of science in Egypt and the Soudan and in South Africa.

The scientific results, including all observations and experiments made by the collectors, will be published from time to time in a journal or bulletin to be issued by the Committee.

It is hoped that by such organized co-operation the knowledge of these matters will be materially increased, so as to render possible the application of effective remedial measures. Offers of cordial assistance have been received from such institutions as the British Museum (Natural History), the London and Liverpool Schools of Tropical Medicine, and the leading universities, in all of which valuable work has already been done in the same direction.

By direction of the Public Prosecutor, proceedings on a charge of manslaughter have been commenced against the manager of the hairdressing department of Harrod's Stores and the operator in the case of a lady who died while her hair was being dry-shampooed with carbon tetrachloride, as reported in the Journal of July 24th, p. 243. At the hearing on August 24th the counsel for the prosecution made an opening statement, and the evidence of Mr. A. J. Pepper was taken. The case was adjourned until Thursday, September 2nd.

MIDWIVES ACT COMMITTEE.

THE Report of the Departmental Committee appointed by the Lord President of the Privy Council on December 6th, 1908, to consider the working of the Midwives Act, 1902, was presented to Parliament last week and was published on August 25th. The members of the Committee were: Sir Almeric W. FitzRoy, K.C.V.O., Clerk of the Privy Council (Chairman); Mrs. Charles E. Hobhouse, Chairman of the Executive Committee of the Rural Midwives' Association; Dr. F. H. Champneys, Chairman of the Central Midwives Board; Mr. J. S. Davy, Assistant Secretary and Chief General Inspector, and Dr. A. H. Downes, Senior Medical Inspector for Poor Law Purposes to the Local Government Board in England and Wales; Dr. F. E. Fremantle, M.O.H., Hertfordshire; and Mr. J. Pedder, Principal Clerk, Home Office; with Mr. H. J. Stanley, Private Secretary to the Lord President of the Council, and Mr. F. J. Welch, Clerk in the Local Government Board, as secretaries.

The report is signed by all the members.

TERMS OF REFERENCE.

The Committee was instructed to consider the working of the Midwives Act, 1902, more particularly with reference to the supply of midwives and the cost of training, the remuneration of medical men summoned on the advice of midwives under the rules in pursuance of the Act, and the delegation of their powers by county councils under the Act.

The Committee held 21 meetings and examined 37 witnesses, 18 of whom were medical practitioners and 8 qualified midwives.

Value of the Act.

The report commences by citing testimony as to the value of the Act and the general goodwill with which it has been received. It is shown that coincident with its operation there has been a notable reduction in the death-rate from puerperal fever from 118 per million females living in 1902 to 81 in 1907, and the opinion is expressed that there can be no reasonable doubt that the Act has contributed to this. It is not quite so clear that the Act has contributed except indirectly to the lowered infant mortality.

The Supply of Midwives.

After stating its opinion that the power of county councils to delegate their powers under the Act to district councils should be withdrawn, the Committee proceeds to discuss the supply of midwives. It is stated that the total births in England and Wales in 1908 numbered 942,611, and the proportion attended by midwives taken all round was about 50 per cent., but varied to a remarkable extent in different localities. In Newcastle only 11 per cent. are attended by midwives, in London 25 per cent., in the West Riding 35 per cent., in the county of Lancaster 49.9 per cent., Liverpool 52 per cent., Manchester 60.9 per cent., Salford 76.5 per cent., Gloucester 83.6 per cent., and St. Helens 93 per cent. The average percentage in the urban districts of Lancaster was 50.8 and in the rural districts 30.9. The total number of midwives on the roll has gradually risen from 22,308 in 1905 to 27,234 in 1909, but not over 15,000 are actually in practice. Notwithstanding the large demand for midwives in Lancaster as shown by the figures for Salford and St. Helens, Sir William Sinclair showed that there are too many to make a living. A shortage of midwives is anticipated after March, 1910, in 15 out of the 50 English counties, and in 12 out of the 71 county boroughs. The question, however, appears to be one of distribution mainly, and the evidence was almost unanimous against postponing that part of the Act which comes into force after March, 1910. There was not the same unanimity on the question whether in sparsely populated rural areas annual licences based on a modified examination might not be issued to meet the deficiency, but it was felt that great confusion would arise from two standards, and that there would be danger of compromising the minimum of safety at present secured; the Committee considered that the powers possessed by the Central Midwives Board would enable it to deal with any exceptional circumstances. The following paragraph is especially important, as bearing on the employment by medical men of women not certified as midwives, who after March, 1910, will be debarred, under a penalty of ten pounds, from attending confinements habitually and for gain otherwise than under the direction of a qualified medical practitioner:

> The Committee are alive to the fact, which was pointed out by several medical witnesses, that the words in Section 1, "otherwise than under the direction of a qualified medical practitioner," might be used in unscrupulous hands to foster the objectionable practice of "covering" the action of unqualified women by the assumption of a purely nominal responsibility on the part of the doctor, but they do not believe that such practices could become common without attracting public attention and bringing the doctor concerned within the disciplinary powers of the General Medical Council, who, they are advised, would treat cases of the kind as examples of "infamous conduct in a professional respect," in the same way as they at present deal with the employment of unqualified assistants.

On the whole, so convinced was the Committee that the problem of supply of midwives is one of their distribution, that it considered that there is no need for any subvention from the State, and that the needs may be met by co-ordinated action of local authorities and voluntary agencies. The cost of midwifery training has greatly increased since the Act came into force, and usually amounts to between £20 and £30. As this is almost prohibitive for working-class women, the Committee considered that the powers of county councils should be extended so as to enable them to contribute where necessary towards the expenses of training midwives for their own districts. At present the councils can only have recourse to funds for higher education for this purpose.

As to training in Poor Law institutions, there is said to be no ground at present for the impression that the Central Midwives Board looks with suspicion on it. The small number of births at such institutions has been the cause of their non-recognition as training schools, and the Committee thinks that their use might be developed, and where the number of births is small arrangements might be made for the nurses in training to attend extern cases under the supervision of the medical officer.

Remuneration of Medical Men.

The report says that when the bill was before Parliament in 1900 Mr. Cohen moved an amendment to provide payment for medical men, but the question does not appear to have come up again in 1902, when the bill finally became law. Later on the Central Midwives Board asked that the Local Government Board should give to a midwife's summons for aid the same legal effect as an order by a relieving officer to the parish doctor, but this was refused. Still later, however, in a letter to Dr. Taylor, of Salford, the Local Government Board pointed out that payment might be made under the Public Health Act of 1875 or the Poor Law Amendment Act of 1848. Four or five councils have availed themselves of the Public Health Act, but the Local Government Board rather discouraged the use of that Act for the purpose. In May, 1906, the General Medical Council urged the necessity of some provision for payment, and, finally, the Local Government Board issued a circular to boards of guardians calling their attention to their powers under the Poor Law Amendment Act. This circular was also sent by the Privy Council to 21,000 practitioners in February, 1908, but we read that "so far as the fact is of any importance the Department has received complaints from only a few medical men that they are unable to obtain payment." At the same time the evidence goes to prove that the absence of any general provision for the payment of medical fees has been a serious obstacle to the realization of the full intention of the Act. In June, 1908, the Central Midwives Board submitted to the Privy Council a memorandum showing the difficulty experienced by midwives in obtaining the assistance of practitioners, owing to the absence of a fee and the danger to the mothers and infants in consequence. It was shown, too, that boards of guardians, in spite of the circular of the Local Government Board, had only used their powers to a limited extent; for instance, in the West Riding, with a population of one and a half millions, out of thirty-three unions, only nine had made any arrangements. In some places the doctors had simply taken their chances of getting paid; in others nursing associations had made themselves responsible for the doctor's fee, while in some places the midwives had paid the fee of any doctor they

had summoned to assist them. In referring to the evidence given on behalf of the British Medical Association on this question, the report says:

> It is satisfactory to note the assurance that the British Medical Association, as the body representing organized medical opinion, is in no way hostile to the Midwives Act, and would certainly discountenance any refusal to attend simply because a midwife had previously been in attendance.
> . . . Without seeking to justify the violent language or callous action of certain practitioners, upon which the Committee have no wish to lay undue stress, Mr. Smith Whitaker testified to the prevalence of a widespread irritation which had resulted in a growing reluctance to recognize the special obligations created by the Act.

Dr. Newsholme and other witnesses also laid stress on the importance of the matter, and the conclusion of the Committee is that:

> Under this weight of evidence the Committee are unanimously of opinion that the Act should be amended by giving the practitioner summoned by a midwife in cases of emergency a secure expectation of payment.

The further questions remaining to be answered were in whom the duty to pay the fees should be vested, by whom the fees payable should be fixed, and on what scale. The objections to county councils paying the fees are the very wide area over which their administration often extends, that they have no machinery for determining the capacity of the patients to pay, and that their power of recovering payment from patients is generally in abeyance throughout the country. The Committee therefore thinks that the Public Assistance Authority ought to pay the fee, and notes that in this it is in agreement with the Majority Report of the Poor Law Commission and the expressed opinion of the Local Government Board. The authority should also be empowered to charge the fee to patients as "relief on loan," which it appears cannot be done at present. Payment, too, is only to be made for emergencies, and the authorities concerned are to draw up a list of conditions coming under this head.

As to the amount of the fee, the evidence varied greatly; but the Committee states that the plan of one fee calculated on a mean scale for cases of varying complexity, with mileage for scattered rural districts, is most satisfactory, and further that the fee should cover "any ordinary after-attendance." A fee of one guinea is said to have given satisfaction in Liverpool, and seems to be favoured by the Committee, though it is left to be fixed by Order of the Local Government Board. The doctor is simply to be required to state that he has been unable to obtain payment from the patient or her representatives. Much evidence was given as to the possibility of collusion between doctors and midwives, and with a view to detect this the guardians are to send a quarterly list of payments to the supervising committees. The question was also raised as to the reciprocal obligation on doctors to attend if the State guarantees a fee. Any idea of making it compulsory on all doctors to attend on the summons of a midwife was stoutly opposed by the witnesses for the British Medical Association, but it was agreed and the Committee finally recommends that a list of those who express themselves as willing to attend should be circulated to midwives.

Miscellaneous Amendments.

It will be seen in the summary of recommendations that the British Medical Association is to nominate one member of the Central Midwives Board, and one reason given for this is that with adequate representation of general practitioners on the board "the superiority of their claims to act as examiners for the board would more readily be recognized," and the Committee thinks this is expedient on general grounds.

The finances of the Central Midwives Board receive careful attention. At present any balance against the board is apportioned between local authorities according to the number of midwives returned as practising in their areas. This places a premium on neglect in sending returns, and those authorities which are most lax get off the best. Hence it is proposed to make the population the basis for the charges, and the effect on each county and county borough is shown in an appendix. The proportion of midwives in practice varies in a remarkable manner in different areas; London notifies only one for each 10,000 population, while the county of Hereford notifies 15 to each 10,000. Taken on the whole the counties notify 10,074 midwives in practice to a population of 22,850,504. Assuming that about £2,000 is required, the counties would pay £1,595 if assessed on the number of midwives, but if assessed on the population they would pay £1,428. The county boroughs notify 2,890 midwives to a population of 9,677,000; they now pay £457, but on a population basis they would pay £604. The effect is specially marked for London, which now pays only £77, but on a population basis will pay £283. Cheshire, on the contrary, with eight midwives to every 10,000, pays £74, but assessed on population will only pay £37. It is further recognized that country members of the Central Midwives Board are at a disadvantage in attending, and the Committee recommends that their reasonable travelling expenses be paid.

The machinery of the Act is thought to offer the most hopeful means of dealing with prevention of blindness from ophthalmia neonatorum. Midwives are therefore to regard it as an emergency for which medical aid must be advised, and it is to be included among the notifiable diseases. The Committee agreed with the suggestion of several witnesses that the Notification of Births Act should be more widely adopted.

An Appendix from the Irish Local Government Board explains the Irish dispensary system of the appointment of salaried midwives by Poor Law authorities, and several witnesses spoke in favour of it, while Sir William Sinclair favoured an analogous system under county councils. The Committee, however, hardly recommends the system, but would prefer an extended use of voluntary agencies by the public relief authority, and only where this cannot be done would it recommend the Local Government Board to authorize such appointments. Outside the Midwives Act the Committee agreed with several departmental committees in recommending statutory provision for registration of still-births.

The witnesses appointed to give evidence on behalf of the British Medical Association were Dr. Flemming of Bradford-on-Avon, Dr. McManus of Battersea, Dr. Taylor of Salford, and Dr. J. Smith Whitaker; the report of their cross-examination extends over thirteen pages of the Blue Book.

Summary of Recommendations.

The following is the Committee's summary of its recommendations:

"(*a*) Supply and Training of Midwives.

"(1) The Committee deprecate any postponement of the date (31st March, 1910) after which uncertified women will, under section 1 (2) of the Act, be prohibited from attending habitually and for gain women in childbirth, except under the direction of a medical practitioner, or in cases of emergency.

"(2) With regard to the suggestion that in sparsely populated rural areas annual licences to practise, based upon a modified examination might, if a serious deficiency occurred, be issued to uncertified women, the Committee, while loth to recommend any departure from uniformity, think that the matter may be left to the discretion which the Central Midwives Board are empowered to exercise in regulating the conditions of admission to the roll.

"(3) The Board might properly consider the expediency of giving another opportunity of enrolment to such trained women as were qualified for admission under section 2 of the Act, but failed to apply before the appointed day (31st March, 1905).

"(4) The Committee, regarding the provision and maintenance of an adequate supply of midwives mainly as a question of organization and distribution, are of opinion that there is no need of any subvention from the State.

"(5) The organization and distribution of the supply should be undertaken by the co-ordinated action of local authorities and voluntary agencies.

"(6) As the most suitable machinery for giving effect to this recommendation, the Committee advocate the establishment of county nursing associations throughout the country, working in co-operation with the local supervising authorities, and affiliated, wherever possible, to

some central body such as Queen Victoria's Jubilee Institute.

"(7) The details of method will necessarily vary in different districts, but the Committee are of opinion that, in general, the formation of county training homes, and of emergency homes, from which midwives can be drafted temporarily to places where their services are required, will be found a hopeful basis of organization.

"(8) The powers of county councils should be extended so as to enable them to charge upon the county fund contributions in aid of the training of midwives for work in their areas.

"(9) Boards of guardians should be encouraged to exercise their powers to subscribe to the support of nursing associations in return for services rendered.

"(10) The general introduction into this country of the Irish dispensary midwives system appears to be unnecessary; but, in places where arrangements cannot be made for the utilization of voluntary agencies, it might be advisable that boards of guardians should be authorized to appoint district midwives.

"(11) The Committee consider that in rural districts the practice of midwifery might, with safety and advantage, be combined with district nursing, provided that the requirements of the medical officer of health and the Rules of the Central Midwives Board are carefully observed. In certain areas the system of cottage resident nurses would be found suitable.

"(12) The possibility in some cases of combining with the functions of a district nurse-midwife the duties of health visitor and, perhaps, also of school nurse, should be borne in mind by local authorities.

"(13) The Committee desire to lay stress on the importance of fostering any provident arrangements by which the classes among whom midwives work could insure, through maternity clubs or otherwise, against the expenses incident to childbirth.

"(14) All possible facilities should be given by the various authorities concerned for the utilization of Poor Law institutions as training centres. The suggestion, that the material available for this purpose might be increased by permitting nurses in workhouses and infirmaries to attend extern maternity cases, is commended to the consideration of the Local Government Board.

"(15) In fixing the standard of training and examination, the Central Midwives Board should, subject to the requirements of safety, have due regard to the needs of the country with respect to supply. The present standard is understood to aim only at ensuring that the women certified thereunder shall be safe and competent midwives, and in existing circumstances the Committee consider that it should not be raised.

"(16) An increase in the number of examination centres is recommended with a view to a reduction in the cost of training.

"(17) On general grounds, the Committee desire to call attention to the expediency of employing as examiners general medical practitioners who have had the necessary training and experience.

"(18) A more extended use of women as examiners might tend to give greater confidence to nervous candidates.

"(19) In this connexion the importance should not be overlooked of framing the examination questions in simple language, with a view to adapting them, so far as possible, to the educational level and restricted vocabulary of the class of women likely to present themselves from rural districts.

"(20) The Central Midwives Board might consider the propriety of accepting, either wholly or partly, in lieu of their own examination, the certificates of examining bodies outside England and Wales, who maintain an adequate standard of qualification.

"(*b*) REMUNERATION OF MEDICAL MEN SUMMONED ON THE ADVICE OF MIDWIVES.

"(1) A secure expectation of payment should be given to a medical practitioner summoned on the advice of a midwife in a case of emergency.

"(2) The Poor Law authority should be responsible for the payment, and should be empowered to charge the fee paid as "relief on loan" to the patient.

"(3) A quarterly return of cases in which payments have been made should be sent by the guardians to the local supervising authority.

"(4) The scale of fees should be fixed by Order of the Local Government Board on a systematic basis, having due regard to local conditions.

"(5) The conditions which should be deemed to come within the category of emergency should be scheduled in the regulations. The Committee suggest that, in addition to cases comprised under the heading of 'labour' in the Rules of the Central Midwives Board, loss of blood during pregnancy, secondary *post-partum* haemorrhage, or septicaemia during the lying-in period, and any inflammation of the child's eyes should be included.

"(6) In emergency cases, the system of a uniform fee, which should cover any ordinary after-attendance, is recommended for adoption, with the addition, perhaps, in scattered rural areas, of some allowance for 'mileage.'

"(7) The medical practitioner, in applying to the public authority, should be required to state that he has been unable to obtain payment of his fee from the patient or her representatives.

"(8) A list of practitioners willing to respond to a midwife's call should be prepared and circulated in every area.

"(9) For cases not scheduled as emergencies, the ordinary machinery of Poor Law medical relief would usually be sufficient.

"(*c*) DELEGATION OF THEIR POWERS BY COUNTY COUNCILS.

"The power of delegation to district councils under section 9 of the Act should be withdrawn; and, in cases where it is still exercised, the delegation should be revoked.

"(*d*) MISCELLANEOUS.

"(1) *Constitution of the Central Midwives Board.*

"(i) The number of members should be increased from nine to twelve, by giving an additional nominee to the Lord President of the Council, and a representative each to the Local Government Board, the British Medical Association, and the Society of Medical Officers of Health. The member appointed by the Incorporated Midwives Institute should in future be a certified midwife, instead of a medical practitioner, and the representation of the Royal British Nurses Association should be discontinued.

"(ii) Following the model, and subject to the safeguards, provided by Section 10 of the Medical Act, 1886, His Majesty in Council should be empowered to consider and, if approved, give effect by Order to any representations received hereafter from the Central Midwives Board for further changes in its constitution.

"(2) *Finances of the Central Midwives Board.*

"(i) Section 5 of the Act should be amended by providing that any balance shown against the Central Midwives Board in their annual financial statement should, after approval by the Privy Council, be apportioned among the local supervising authorities on the basis of population according to the most recent census return, instead of on the basis of the number of midwives who have notified their intention to practise.

"(ii) The Committee recommend that the members of the Central Midwives Board should be paid, in respect of their attendances, such reasonable travelling expenses as may be allowed by the Board.

"(3) *Midwives Roll.*

"(i) With a view to ensuring the accuracy of the roll, every midwife, whether intending to practise or not, should be required to notify annually, in the month of January, her address to the local supervising authority of the district in which she resides; any change of address during the year to be notified immediately, and, in the case of a woman commencing a new practice, the notification to be made at the date of such commencement.

"(ii) The local supervising authority should within the first fortnight of the year send to every midwife in their area a form on which, in addition to the notification of her name and address and the number and date of her

certificate, she should have to state whether she intends to practise or not.

"(iii) It should be made clear in the form of notification that, unless it be duly returned, the midwife's name would be removed from the roll, and would not be restored without the payment of a fee.

"(iv) A list of all midwives from whom notifications have been received should forthwith be transmitted by the local supervising authority to the Central Midwives Board.

"(v) The Board should be empowered to act in the place of any local supervising authority making default in this matter, and to charge them with the expense incurred.

"(4) *Disciplinary Functions.*

"(i) The existing power, vested in local supervising authorities under section 8 (3) of the Act, to suspend a midwife from practice in order to prevent the spread of infection, should be limited strictly to actual cases of infection and to the time necessary to remove all risk of infection.

"(ii) Local supervising authorities should further be empowered to suspend a midwife for any breach of the provisions of the Act or of the Rules of the Central Midwives Board, pending the prosecution of the woman before a court or the adjudication of the case by the Board.

"(iii) This power of disciplinary suspension should only be exercisable when the authority proceed forthwith to prosecute the woman or to submit her case to the Board.

"(iv) A power of suspension in lieu of, or as a preliminary to, striking off the roll, should be conferred on the Central Midwives Board.

"(v) The Board should, at their discretion, have the power to pay the whole or part of the expenses of a midwife who has been required to appear before them in her own defence.

"(vi) When a woman's name has been removed from the roll, she should be required, under penalty, to surrender her certificate without delay, and she should thereafter be prohibited from attending professionally on a lying-in woman in any capacity.

"(vii) In order to prevent any evasion of the disciplinary restrictions of the Act by certified women, who abstain from giving notice of intention to practise, and claim merely to be acting as monthly nurses under a doctor, an amendment of the provisions of section 10 is recommended

(5) *Private Lying-in Homes.*

"The suggestion that lying-in homes conducted for gain should be specially registered seems worthy of consideration, and the Committee think that the powers of local supervising authorities should be extended, so as to include the inspection of the work of certified midwives in such homes, whether kept by them or not.

(6) *Prematurely-born Children.*

"The Rule of the Central Midwives Board, requiring midwives to ask for medical aid in cases of 'dangerous feebleness' of the child, might be strengthened by the insertion of an explicit reference to premature births.

"(7) *Ophthalmia Neonatorum.*

"(i) The Board should also prescribe that medical help should be summoned whenever a midwife notices symptoms in the mother or child indicating any risk of ophthalmia neonatorum.

"(ii) This disease might with advantage be made notifiable under the Infectious Disease (Notification) Acts by inclusion in the list of the diseases specified in section 6 of the Act of 1889.

"(8) *Notification of Births Act.*

"The general adoption of the Notification of Births Act, 1907, throughout the kingdom is recommended as a valuable supplement to the operation of the Midwives Act. Failing this, the addition of a column in the Register of Births, for entry of the name and status of the person who actually delivered the mother, would probably help to promote efficiency and check abuses in the practice of midwives. It would be desirable that such particulars should be required in all notifications under the Act of 1907, and, if necessary, the Act should be amended in this sense.

"(9) *Still-births.*

"Statutory provision should be made for the registration of still-births.

"(10) *Inquiries by the Local Government Board into the effects and working of the Act.*

"(i) The medical staff of the Local Government Board might with advantage investigate the relation between the administration of the Act and the rate of puerperal mortality in different areas.

"(ii) The Committee also suggest that the working of the Act should be reported upon whenever a special inquiry into the general sanitary condition of any district is instituted by the Department.

"(11) *Minor Amendments of the Act.*

"(i) It should be made the duty of the Central Midwives Board to present to the Privy Council an annual report of their proceedings.

(ii) The medical officers of counties and county boroughs should be required to report annually to their authorities on the administration of the Act in their areas; copies of these reports should be forwarded to the Privy Council, the Local Government Board, and the Central Midwives Board, who should include a digest in their own report.

"(iii) Midwives should be supplied with stamped forms for all notifications which they are, or may be, required to make to the local supervising authorities or the Central Midwives Board, and any books prescribed for their use should be provided gratuitously by the authority.

"(iv) For the purposes of section 3 of the Act, the General Medical Council should be empowered to act through their Executive Committee, instead of through the English Branch Council."

Conclusion.

"The Committee believe that, if these recommendations, none of which present any considerable difficulty, are adopted in a spirit of sympathy with the objects of the Act, they will go far to dissipate the prejudice that attaches to it in certain quarters, and materially reduce any obstacles to its operative success, now attributable to lack of information, obscurity of purpose, or administrative apathy."

LITERARY NOTES.

Messrs. J. and A. Churchill are about to publish *A Textbook of Nervous Diseases*, by Drs. A. Aldren Turner and T. Grainger Stewart. This work will cover the whole range of nervous disorders and their treatment, and will contain a large number of original illustrations. The same publishers also announce a small *Textbook of Experimental Physiology*, by Drs. N. H. Alcock and F. O'Brien Ellison, with an introduction by Professor E. H. Starling, a short illustrated handbook on *Sight Testing*, by Dr. W. W. Hardwicke, and a second edition of Dr. A. A. Warden's *Guide to the Paris Medical School.*

Messrs. William Hodge and Co., Edinburgh and Glasgow, will shortly publish a work entitled *Construction, Equipment, and Management of a General Hospital*, by Donald J. Macintosh, M.B., M.V.O., Medical Superintendent of the Western Infirmary, Glasgow. The book will deal with the theory and practice of hospital construction and administration, and besides plans of the most approved types of wards and auxiliaries, will contain over sixty carefully reproduced illustrations showing wards, operating theatres, laundry and special departments, and all kinds of hospital furniture and requirements. The book is intended for the use not only of architects, but of medical men and laymen interested in hospital construction and administration

The net profits of the recent fête at Olympia on behalf of the Great Ormond Street Hospital for Sick Children amount to £2,610.

THE MEDICAL SERVICE OF THE TERRITORIAL FORCE.

GENERAL HOSPITALS.

IN the scheme for the organization of Voluntary Aid issued by the War Office on August 16th, a full account of which was published in the BRITISH MEDICAL JOURNAL last week, the subject of general hospitals is frequently mentioned. A memorandum (Circular Memorandum No. 31) which was issued by the War Office in May, 1908, gave information and instructions with regard to the establishment and staffing of these hospitals, and it will be useful now to give a general account of their purpose and of the mode in which they are to be organized.

Their personnel will consist of officers forming the medical and surgical staff, and of nurses, in addition to other officers, non-commissioned officers and men, who undergo training in time of peace for the duties which they will have to perform on mobilization. There are twenty-three selected localities for the establishment of these general hospitals.

It is obvious that, having regard to climatic conditions, tented hospitals should be exceptional, while having regard to the rapidity with which these hospitals would be called into being and required to begin their work, huts are out of the question. Moreover, buildings of a suitable kind could be easily transformed into military hospitals for temporary purposes.

In the scheme the County Association is primarily concerned with the selection of suitable buildings, but it may delegate the selection to the British Red Cross Society. Whichever agency undertakes the selection of buildings, and before any building is deemed suitable, the concurrence of the Administrative Medical Officer, the commanding officer, the sanitary officer, and the organizing matron must be obtained, for the fitness or otherwise of a building for the use of the hospital can only be determined with due regard to administrative, sanitary, and nursing arrangements.

The Administrative Medical Officer of the Division, who is the staff officer for medical purposes of the General Commanding, would naturally, in reporting upon a building, fortify himself with the knowledge and experience of the members of the administrative staff of the hospital, that is to say, the officer in charge, the registrar, and the quartermaster.

It should be remembered that a military hospital is something more than merely a hospital. It may be regarded as the dépôt for war casualties. It is upon this point that the flotsam and jetsam of an army is concentrated. It is in the hospital that the fitness or otherwise of officers, non-commissioned officers and men to return to their corps is determined. It is here that the soldier is re-equipped for the field and there are branches of the hospital specifically connected with the business of the soldier, and the maintenance of connexion with the unit to which he belongs. These hospitals maintain touch with the several fighting units of the army, and their discharge dépôts are scenes of constant activity throughout a war.

It is manifest, therefore, that in selecting buildings for military hospitals, the requirements of the sick are not the only consideration. If in the scheme and the memorandum these things are but slightly touched upon, it must be because it is taken for granted that the officers concerned in the selection of buildings possess an intimate acquaintance with the subject. The main points to be attended to in selecting buildings are the provision of accommodation for arms stores and military equipment, pack stores, stores for new clothing for issue to men rejoining their battalions, rooms for company officers, and accommodation for the clerical staff which maintains the records upon which pensions and compensations depend. The administrative staff of the hospital is trained specifically in the duties pertaining to these several departments in a military hospital in time of peace. As to the method to be pursued in making the selection, the scheme contains the following paragraph:

> As regards general hospitals, County Associations should either themselves or through the British Red Cross Society proceed to select the necessary buildings in consultation with administrative medical officers, officers commanding the general hospitals, and sanitary officers of their Territorial division; and plans should be drawn up showing how the buildings will be arranged for hospital purposes, the organizing matron also being consulted regarding these.

Circular Memorandum No. 31 contains the following paragraph:

> The medical corps of the Territorial Force will train in peace a nucleus of men, consisting mainly of those to whom duties of a highly specialized nature would be entrusted. Local branches of the Red Cross Society could render very valuable assistance if they would undertake the task of providing the balance of establishment of the hospital, mainly consisting of men to whom those duties which do not demand a very special training could be allotted. The local knowledge possessed by the representatives of the Society would be of the greatest value as enabling them to draw up lists of individuals who would be prepared in case of national emergency to aid their country's cause in the hospitals, though precluded by unavoidable circumstances from undertaking serious responsibilities in times of peace.

It is with the object of obtaining the necessary intimate acquaintance with the work that the training of the Medical Service of the Territorial Force has become so strenuous, not only for the field units but also for the administrative hospital staffs. As the personnel of these institutions become familiar with the subject, the necessity for training in large military hospitals in time of peace, rather than in the camps, is becoming daily more appreciated.

The guiding principle of all medical organization should be the fact that the non-effectives of an army are in the custody and care of the medical branch of that army from the moment that the individual falls out of the ranks until he returns thereto. Every item of his well-being, his feeding, his clothing, his transportation and his accounts, are in the hands of the medical authorities. If these principles are remembered, the importance of the Territorial general hospitals to the Territorial Force must be appreciated.

COMPULSORY INSURANCE AGAINST SICKNESS AND INVALIDITY.

IT will be within the recollection of many of our readers that the Chancellor of the Exchequer, when making his Budget speech this year, travelled beyond the ordinary limits of a financial statement and sketched in some detail the proposals of the Government in regard to social reform. He foreshadowed legislation intended to remedy a number of admitted evils, evils which have been scarcely touched by the passing of the Old Age Pensions Act of 1908. He indicated the distress among the working classes due to unemployment and sickness as a problem which would be dealt with almost at once.

With regard to unemployment, the initial steps have already been taken to provide a remedy by the introduction of a bill for the establishment of labour exchanges. This bill passed its second reading in the House of Commons without a division, and is expected to become law before the end of the present session. It is intended that the labour exchanges shall bring employers and workmen together, and by the interchange of information between one part of the country and another a demand for labour in any particular district will, it is anticipated, be met without difficulty. The unemployed workman will be brought into touch with work which is waiting to be done, no matter where the demand has arisen, and although work will not be created by this means, the system should at least put an end to the possibility of the prevalence of distress through unemployment in one locality at a time when employers in other districts are unable to obtain sufficient workmen for their needs. The next step in the Government scheme—a step which will commend itself to thinking members of the community, as tending towards the separation of the idle from the industrious, of the "unemployable" from the "unemployed"—is the introduction of compulsory insurance against unemployment, extending at first to all persons engaged in certain selected trades, and ultimately, it is hoped, to all trades throughout the country.

We have not sufficient space to enter further into the details of the proposals which are intended to meet the evil of unemployment. There is, however, another portion of the Government programme of social reform

which more directly affects medical practitioners—namely, provision for times of sickness and invalidity.

It is a well-known fact that, in spite of the efforts of the friendly societies, there are at the present time several millions of persons in this country who have made no substantial provision for periods of sickness and consequent unemployment, and who, if overtaken by ill health, are liable to suffer acute distress or to depend upon the provisions of the Poor Law and upon private charity for relief. Few persons are better acquainted with the extent of this evil than the medical practitioner who carries on his profession in a working-class district. He is brought into frequent contact with the incapacitated workman, and is virtually compelled, in certain circumstances, to provide him with free medical attendance. A partial remedy has been provided by the coming into operation of the Old Age Pensions Act, under which all persons over 70 years of age may be spared the worst horrors of extreme poverty. This Act, however, is of no assistance to incapacitated persons who have not reached the age of 70, and it is to meet the case of this latter class that the Government proposes to establish a system of compulsory insurance against sickness and invalidity.

In launching a vast scheme of social reform it is necessary to proceed with extreme caution. The effects of a far-reaching proposal are seldom fully appreciated at the outset, and the removal of one long-standing grievance is too frequently accompanied by the unintentional introduction of evils in other directions. To quote but a single instance. The passing of the Old Age Pensions Act has undoubtedly ameliorated the lot of many thousands of deserving persons who had been left without adequate means of support in their declining years. But the condition that the income of the would-be pensioner must not exceed a certain sum per week, while in itself not unreasonable, must have a direct effect in discouraging thrift among the very class of people which it is desired to benefit. This effect of the Old Age Pensions Act is particularly felt by members of the great friendly societies, who, by rigid self-denial during the greater part of their lives, have contributed sums intended to secure a provision for their old age, and now find that the modest provision which they have made for themselves effectually debars them from receiving old age pensions which are awarded to their careless and unthrifty neighbours, who, with equal opportunities, may never have attempted to provide for the future.

Until the Government proposals respecting insurance against invalidity are explained in detail and embodied in a bill, it is impossible to say exactly how far they will go, or whether they are likely to provide a satisfactory remedy for the evils they are intended to remove. Several authoritative, or at least inspired, statements have, however, been made and reported in the press, and from these and other sources of information it is possible to outline the shape which the system will probably take.

In the first place, it is to be a compulsory, self-contributory, and State-aided scheme, modelled to a considerable extent on the system at present in operation in Germany. The benefits to be provided are for temporary and permanent sickness and invalidity, and include a weekly money payment, medical and surgical aid, and sanatoriums. The payment during sickness is to be not less than 5s. per week, provided that the incapacitated person is not receiving payments under the Workmen's Compensation Acts. The contributions will necessarily vary according to the age of the person insuring, who may be either a male or a female between the ages of 16 and 70 years. Employers will deduct from the wages of their workmen the weekly contributions payable by them, which may possibly average about 3d. per head per week. To the amount so deducted the employer will be required to add 1d., and a further penny will be added by the State. The aggregate of these contributions—say, 5d. per week per head—will constitute the premiums set aside to form the insurance fund.

The benefits indicated above are the minimum benefits to be insured, and insurance for these minimum benefits will be compulsory. It will, however, be open to members to insure for larger amounts than 5s. per week if they wish to do so.

It has from the outset been plain that any scheme of the kind referred to would be doomed to failure if it interfered materially with the work of the great friendly societies. These societies already cover the ground of the Government proposals as far as their own members are concerned, and the mere suggestion of a competing system has stirred them to their depths. At the conference of the Manchester Unity of the Independent Order of Oddfellows, held at Bradford in June this year, the Grand Master of the Order, Mr. B. Kilvington, expressed in strong terms the feeling of apprehension which exists among the members, and went near to repudiating the Government scheme without knowing of what it is to consist. His views received a general support at Bradford, but other friendly societies have taken up a more moderate attitude, an attitude rather of benevolent neutrality than of hostility. Some further light has been thrown on the Government proposals since the Bradford conference, and it is now evident that the intention is to work with and through the best friendly societies, and not in opposition to them. It is stated that solvent friendly societies of a permanent character will be to some extent reorganized and "recognized" by the Government. The worker who is a member of a recognized society will present to his employer his contribution card, or other evidence that his subscription is not in arrear, and will then be exempt from deduction from his wages. The pennies of the employer and the State will be paid to the society in aid of its sickness funds, which will be correspondingly strengthened. Inasmuch as the sick benefits receivable by the members of friendly societies usually exceed those proposed to be granted under the Government scheme, it is not anticipated that the latter will compete with the work of the societies, while the element of compulsion will operate to bring in the large number of persons who are at present not reached by any optional system of insurance.

Assuming that the Government proposals follow the general lines indicated above, it is evident that members of the medical profession who practise in working-class districts will be materially affected. No authoritative statement has, so far as we are aware, been made as to the extent of the medical and surgical aid that is to be provided for the incapacitated workman. It has been freely stated that there are nine millions of artisans in the United Kingdom who are not members of any friendly society, and who would consequently be affected by the Government scheme. It is clear that the provision, by the State, of medical and surgical treatment in times of sickness for so large a number of persons would be a huge task, and one requiring to be thoroughly thought out before it was undertaken. Medical practitioners, if called upon to take part in a great national scheme intended to contribute materially to the welfare of the community at large, and especially to that of its poorest members, may be relied upon to respond whole-heartedly, and to afford their services ungrudgingly where they are required. It would, however, be unreasonable to expect that skilled service should be given without adequate remuneration, although it is by no means certain that adequate remuneration would invariably be offered, especially if the settlement of the question were placed in the hands of local bodies. It therefore behoves the profession to keep a watchful eye on the development of the proposals of the Government, and to see that the legitimate interests of its members are safeguarded. It is not unlikely that the local medical officers of health will in many districts be called upon to assist in carrying out the scheme, and, if so, they owe it to the profession as well as to themselves not to accept work either at salaries or at contract rates which are below the recognized standards. If a workable scheme of compulsory insurance against sickness and invalidity, controlled by the State and accepted by the community generally, can be evolved by the Government, and the support of the medical profession as a whole obtained for it, a great advance will be made towards the solution of one of the most pressing of the social problems of to-day. The opportunity is great; may the achievement be not unworthy of the opportunity.

THE children's institute established some thirty years ago at Bad Nauheim has recently taken possession of a new building with 200 beds, wherein it is hoped to treat some 1,200 children in the course of the year—1,000 in summer and 200 in winter. The age limits are 3 and 16 years, and the diseases treated are for the most part cardiac disorders, scrofula, rickets, anaemia, and malnutrition.

THE

COMPOSITION OF SOME PROPRIETARY FOOD PREPARATIONS.

III.—VARIOUS RESTORATIVES AND TONICS.

IN addition to the meat wines and medicated wines already dealt with, a number of other preparations are put forward for use as stimulating and restorative foods in convalescence, conditions in which digestion is impaired, etc. Certain of these, although not called wines, are decidedly vinous in character, while others have nothing in common with wines. A few of the best-known examples of the different kinds are here described.

It may be well to repeat that the object of the analyses recorded is to give data for the comparison of these preparations in respect to certain characters, such as alcoholic strength, percentage of nitrogenous constituents, etc. It is evident that complete comparisons could be based on such figures only if the qualitative composition of all the articles were identical, which is far from being the case. It would not be possible, within the limits of the present investigation, to determine the relative amounts of the different nitrogenous constituents, peptones, albumoses, extractives, etc., in each preparation described, and the value of such information would not be commensurate with the time and labour which it would require. It will be readily seen that of two preparations the one containing the smaller quantity of nitrogenous constituents may have the greater food value if all the nitrogen in it is present as peptone, but as extractives in the other. Nevertheless, the figures here given enable some useful comparisons to be drawn.

When reducing sugar has been found present, the amount has been determined, and, for the purpose of calculation from the results, it has been assumed to be all glucose. In each case in which glucose is named it has been proved to be present, but it does not follow that the whole of the reducing sugar present was glucose; some part of it may have been either maltose or lactose. The percentage of nitrogen found is given, as also the corresponding amount of protein; but in most cases a part of the nitrogen, and in some the principal part, was present in the form of extractives.

A.

The first five preparations form a group with certain characters in common.

CARNRICK'S LIQUID PEPTONOIDS.

This preparation is to be obtained from Carnrick and Co., Ltd., London. A bottle costing 3s. 6d. contained just over 9 fluid ounces. It is described on the label as "Beef, milk, and gluten, perfectly digested. Contains the albuminoid principles of beef, milk and wheat, entirely digested and ready for assimilation."

Dose: For an adult, one or two tablespoonfuls three to six times a day.

One hundred parts by measure were found to contain:

Alcohol	20.0	parts by measure.
Total solids	18.8	parts by weight.
Nitrogen	0.8	,,
(equivalent to protein	5.0	,,).
Ash	0.8	,,
Reducing sugar, calculated as glucose ...	7.7	,,
Cane sugar	2.4	,,

ARMOUR'S NUTRITIVE ELIXIR OF PEPTONE.

This elixir is made by Armour and Co., Chicago, and the price of a bottle containing 16½ fluid ounces was 4s. It is described on the label as "A palatable liquid food presenting the entire digestible substance of specially selected fresh Lean Beef in readily absorbable form."

Dose: One dessert to one tablespoonful three times a day and at bedtime.

One hundred parts by measure were found to contain:

Alcohol	15.4	parts by measure.
Total solids	7.1	parts by weight.
Nitrogen	0.3	,,
(equivalent to protein	1.9	,,).
Ash	0.6	,,
Reducing sugar, calculated as glucose ...	2.2	,,
Glycerin	13.0	,,

PANOPEPTONE.

This preparation, sold by Fairchild Bros. and Foster, New York, at the price of 2s. for a bottle containing about 6 fluid ounces, is described on the label as "the nutritive constituents of Beef and Wheat in a soluble and freely absorbable form."

Dose: For adults, from a dessert to a tablespoonful several times a day and at bedtime.

One hundred parts by measure were found to contain:

Alcohol	20.0	parts by measure.
Total solids	26.9	parts by weight.
Nitrogen	1.14	,,
(equivalent to protein	7.2	,,).
Ash	1.1	,,
Reducing sugar calculated as glucose ...	7.8	,,

CARNABYN.

Carnabyn, sold by Hooper and Co, London, W., at the price of 2s. 6d. for a bottle containing 12 fluid ounces, is described on the label as a "nourishing digestive and restorative compound."

Dose: From half to a wineglassful three times a day.

One hundred parts by measure were found to contain:

Alcohol	17.2	parts by measure.
Total solids	13 4	parts by weight.
Nitrogen	0.26	,,
(equivalent to protein	1 7	,,).
Ash	0 7	,,
Reducing sugar, calculated as glucose ...	9.2	,,

VINSIP.

This preparation is to be obtained from Vitalia, Limited, London, S.E. A bottle containing 3½ fluid ounces cost 1s. 6d. "Liquor Haemoglobin Co." is given on the label as an alternative name.

Dose: Adults, one to three teaspoonfuls twice or thrice daily.

One hundred parts by measure were found to contain:

Alcohol	8.6	parts by measure.
Total solids	20.2	parts by weight.
Nitrogen	2.9	,,
(equivalent to protein	18 2	,,).
Ash	1.0	,,

The liquid coagulated on heating, and haemoglobin was found to be present. It contained no glucose or other reducing sugar.

B.

The next two preparations show many resemblances to some of the medicated wines described in the preceding article.

COCA-BYNIN.

This preparation, sold by Allen and Hanburys, Limited, London, at the price of 2s. 6d. for a bottle containing 10 fluid ounces, is described on the label as "a combination of the active principles of the Coca leaves with Bynin, Liquid Malt. It thus possesses the valuable diastasic properties of malt, or the power of digesting and promoting the assimilation of farinaceous foods, with the stimulating and exhilarating effects of the Coca plant."

Dose: A dessertspoonful added to a glass of sherry or other wine.

One hundred parts by measure were found to contain:

Alcohol	10.7	parts by measure.
Total solids	54.2	parts by weight.
Nitrogen	0.6	,,
(equivalent to protein	3.8	,,).
Ash	1.2	,,
Acidity, calculated as lactic acid	0.8	,,
Reducing sugar, calculated as glucose ...	35.7	,,
Or calculated as maltose	57.6	,,
(Glucose was present in considerable quantity).		
Alkaloid	0.025	parts by weight.

The alkaloid produced a slight numbness when applied to the tongue. After neutralizing some of the original liquid and removing the alcohol at a low temperature, the diastatic action was tested for by means of gelatinized starch; no digestion of starch was observed.

MARIANI ELIXIR.

This elixir, prepared by A. Mariani, Paris, and sold in this country at the price of 4s. 6d. per bottle containing 12½ fluid ounces, is described in the circular accompanying

it as "more alcoholic, very agreeable, and three times as highly charged with the active principles of the Peruvian Leaf as the Vin Mariani."

Dose: One liqueur glass after the principal meals.

One hundred parts by measure were found to contain:

Alcohol	36.3	parts by measure.
Total solids	30 3	parts by weight.
Ash	0.2	,,
Reducing sugar, calculated as glucose ...	9.8	,,
Cane sugar	17.5	,,
Alkaloid	0.025	,,

The alkaloid produced considerable numbness when applied to the tongue.

C.

The next preparation is not alkaloidal, and is more of the nature of beer than wine.

PABST EXTRACT.

The Pabst Brewing Co., Milwaukee, U.S.A., describe this preparation on the label as "a liquid preparation of malt and hops, combined with calcium hypophosphite and iron pyrophosphate. Alcohol 5 per cent." A bottle, price 1s. 1½d., contained 14½ fluid ounces.

Dose: A wineglass at each meal, and one before retiring.

One hundred parts by measure were found to contain:

Alcohol	6.2	parts by measure.
Total solids	9.4	parts by weight.
Nitrogen	0 12	,,
(equivalent to protein	0.76	,,).
Ash	0.3	,,
Dextrin	4.1	,,

No sugars were present. The total phosphate in the ash, calculated as phosphoric acid (H_3PO_4), was 0.18 per cent. of the original liquid; this would include any hypophosphite and pyrophosphate originally present.

The next preparation is of a different character from most of those here dealt with, but presents no very abrupt transition from the liquid just described.

KHOOSH BITTERS.

This preparation, described on the label as "a never-failing appetizer. The only bitters that act on the liver," is to be obtained from Khoosh Bitters, 1906, Limited, London, W.C.

A bottle costing 2s. 6d. contained about 6 fluid ounces.

The dose appears to be from 20 drops to one teaspoonful.

One hundred parts by measure were found to contain:

Alcohol	14.4	parts by measure.
Total solids	0.14	,,

The residue agreed in its characters, behaviour with solvents, etc., with the residue of tincture of quassia. The bitter substance quassin cannot be distinguished from some other neutral bitter principles by any tests which were applicable in this case, and it is not possible to state positively that this preparation is made from quassia.

D.

The remaining preparation differed from the others in containing no alcohol, but, as its application is intended to be similar, it is included here.

VIGORAL.

This is made by Armour and Co., Chicago, and a bottle costing 1s. 9d. contained 3⅓ fluid ounces. It is described on the label as prepared from "extract of beef with the addition of other nourishing and muscle forming constituents. For strength, nourishment, and refreshment."

One hundred parts by weight were found to contain:

Total solids	50.8	parts by weight.
Nitrogen	3.8	,,
(equivalent to protein ...	24.0	,,).
Ash	16.0	,,

The chief constituent of the ash was sodium chloride. Sugars were absent.

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THE seventy-ninth annual meeting of the British Association for the Advancement of Science began at Winnipeg on August 25th, the first act of the session being the instalment of Sir J. J. Thomson, F.R.S., in the office of President, in succession to Dr. Francis Darwin. The meeting is to last a week, and during its course two formal addresses are to be delivered in addition to those of the President of the Association and of the presidents of the eleven sections among which the work of the meeting is divided. Two "Popular" Lectures are also to be given, dealing with the chemistry of flame and the pressure of light respectively.

PRESIDENT'S ADDRESS.

Sir Joseph Thomson gave an account of recent advances in physical science, more especially in relation to electricity, but devoted about half the time at his disposal to questions of education. He had come, he said, to the conclusion that there was a good deal in the system of the older English universities which those of younger date, both at home and abroad, had been wise not to imitate. Cambridge suffered from the excessive competition for scholarships. Preparation for these competitions dominated the education of the great majority of the cleverer boys, for to make his boys win scholarships was often deemed the best test of the efficiency of a schoolmaster.

Evils of Early Specialization.

Preparation for scholarship-winning too often meant that for about two years before the boy expected to go to a university he began to specialize in the branch of work in which he hoped to prove a scholarship winner, and on entering the university he spent three or four years studying the same subject.

The net result of adhering to one subject only for so long was that, though the student became often very remarkably acquainted with it, he began research work with much of his early enthusiasm evaporated. Research work was difficult, laborious, and even disheartening, so that hardly any quality was more essential for success than enthusiasm, and no greater evil could be done than to dull that enthusiasm in a young man. Furthermore, premature specialization injured students by depriving them of adequate literary culture, and by tending to isolate one branch of science from another retarded the progress of science as a whole. The boundaries between the sciences were arbitrary, and tended to disappear as science progressed; and one science often found most striking and suggestive illustrations in the phenomena of another.

Physics and Mathematics.

Again, the specialization prevalent in schools often prevented science students acquiring sufficient knowledge of mathematics; it was true that most of those who studied physics did some mathematics, but in general they did not do enough, and were not as efficient physicists as they would have been if they had acquired a knowledge of that subject. He did not suggest that a physicist should confine himself to looking at his problems from a mathematical point of view; but two points of view were better than one, and the physicist who was also a mathematician posessed a most powerful instrument for scientific research, and one by which many of the greatest discoveries had been made; electric waves, for instance, were discovered by mathematics long before they were detected in the laboratory. Similarly, the full significance of physical discoveries was often not appreciated until they had been subjected to mathematical treatment. Finally, the man who was a mathematician as well as a physicist had at his command a language clear, concise, and universal, and there was no better way to detect ambiguities and discrepancies in ideas than by trying to express them in this language. The mind by itself was comparatively unproductive and the most fruitful groups of scientific ideas arose from cross-fertilization between the mind and some definite fact. The origin of the most comprehensive and important scientific ideas could be traced back to attempts to find an explanation of some apparently trivial and very special phenomenon. Once started the ideas grew to such generality and importance that their modest origin could hardly be appreciated. Just as water vapour

would refuse to condense into rain unless there were particles of dust to form nuclei, so would ideas before taking shape seem to require a nucleus of solid fact around which they could condense. Most people required to tackle some definite difficulty before their minds developed whatever powers they might possess. This was true even of the youngest, and the moral to be drawn was that an endeavour should be made to make education as little bookish and as practical and concrete as possible. It was possible to read books and to pass examinations without the higher qualities of the mind being called into play, but it was not possible for boys to make boats or for girls to cook dinners without using their brains.

Similarly, it was the need for thought and action which gave to research an educative value, even in the case of those who did not intend to become professional men of science. In the same connexion the speaker advocated interchange of students among the universities of the empire. There should be a recognition of each other's examinations, residence, and degrees. He did not mean that all universities in one country should be under one government, for he was a strong believer of the individuality of universities, but such individuality was in nowise inconsistent with the policy of an open door from one university to every other in the empire.

The Structure of Matter.

Dealing with the problems of the future, the speaker pointed out that considerable progress had been made in the task of discovering the structure of electricity. It was known that negative electricity was made up of units all of the same kind; that they could be obtained from all substances; that in point of size they were no greater that $\frac{1}{1700}$ part of the mass of an atom of hydrogen; and that with suitable conditions they moved with enormous speed, approaching that of light. On the other hand, comparatively little was known about positive electricity, but on the whole it seemed likely that it would eventually be proved that a unit of positive electricity was quite different to a negative corpuscle, and in point of size equal to an atom of hydrogen. A knowledge of the mass and size of the two units of electricity would afford material for constructing a molecular theory of electricity which would be a starting point for a theory of the construction of matter. As a provisional hypothesis, the most natural view to take was that matter was merely a collection of positive and negative units of electricity, and that the forces which held atoms and molecules together, the properties which differentiated one kind of matter from another, all had their origin in the electrical force exerted by positive and negative units of electricity, grouped together in different ways in the atoms of the different elements.

Sources of Energy.

Since the energy associated with a given charge varied inversely as the size of the body on which this was concentrated, the energy stored up in the negative corpuscle must be far greater than that stored up by a positive unit. The amount of energy stored up in ordinary matter in the form of the electrostatic potential energy of its corpuscles was not generally realized. All substances gave out corpuscles, and it might be assumed that each atom of the substance contained at least one corpuscle. On this supposition he calculated that the potential energy of a gram of hydrogen equalled seven times the heat developed by one gram of radium or by the burning of five tons of coal. Thus even ordinary matter contained enormous stores of energy kept fast bound by the electrical corpuscles. This was fortunate, for if an appreciable fraction at any time got free the earth would explode and become a gaseous nebula.

Such matter, however, formed but an insignificant fraction of the universe, mere islands in the great ocean of ether, which was not a fantastic creation of the speculative philosopher, but as essential as the air we breathe. It transmitted the energy of the sun, which practically did all the work of the world, and it must contain something which, like ordinary matter, could store up energy in addition to much other work.

The Age of the World.

The nature of radium and radiation was also discussed; alpha rays had been shown by Rutherford to be positively electrified atoms of helium, moving at about one-tenth of the speed of light; beta rays were negatively electrified corpuscles, moving at nearly the velocity of light; and gamma rays were unelectrified, and analogous to the Roentgen rays. One special significance of the discovery of radio-active bodies was in relation to the age of the earth. The discovery had annihilated one method of calculating this age, but had supplied another, namely, by measuring the amount of helium given out by all radio-active bodies. On this basis the age both of particular rocks and of the crusts of the earth could be calculated, and the total age of the earth shown to be more than twice as much as that at which Lord Kelvin had previously estimated it, namely, about a million years.

Finally, said Sir Joseph Thomson, recent discoveries in physics and potentialities suggested by them had had an effect upon progress of science akin to that produced in literature by the Renaissance. Enthusiasm had been quickened, and there was a hopeful, youthful spirit abroad, which led men to make with confidence experiments which would have been thought fantastic twenty years ago. As peak after peak was conquered, regions full of interest and beauty were seen, and in the distance still higher peaks, which would yield to those who ascended them still wider prospects and deepen the feeling, whose truth was emphasized by every advance in science, that "Great are the works of the Lord."

Medical News.

DR. E. ARTHUR DANDO has been appointed by the Lord Chancellor to be a Justice of the Peace for the Borough of Dudley.

THE Imperial Cancer Research Fund has received a donation of £1,000 from the Duke of Bedford to meet an overdraft at its bankers.

THE seventieth birthday of Duke Karl Theodor of Bavaria was celebrated at his castle of Possenhof on August 9th. The duke, in spite of advancing years, still maintains his Ophthalmological Clinic at Munich.

THE plans of the new Examination Hall of the Royal colleges in London have yet to be settled, but preparation of the new site in Queen Square, Bloomsbury, is to be taken in hand forthwith. The houses which the two Colleges have jointly acquired are on the west side of the square, close to the Alexandra Hospital for Hip Disease, and nearly facing the opening of Great Ormond Street.

THE Local Government Board has granted an application from the Stoke-on-Trent Town Council for permission to include ophthalmia neonatorum among the diseases notifiable within its area. The new Order will come into operation in the district on August 28th, and remain in force for twelve months. Other sanitary authorities in the pottery district are taking steps towards the same end.

A TELEGRAM to the *Times* announces that the report of the International Opium Commission which sat in Shanghai in February last was issued there on August 24th. It consists of two volumes, the first containing minutes of the transactions, and the second reports put in by the delegates regarding opium legislation in the various countries represented, and statistics relating to opium growing, the opium habit, the opium trade, and the revenue derived from opium culture or trade, together with the international agreements respecting traffic in the drug.

IT was recently announced that the Orient Line had granted free first-class tickets between Australia and England to selected scholars of the Australian universities, and the three first nominations have now been made by the Chancellor of the Sydney University. Messrs. H. J. Swain, Science Research Scholar, S. G. Lusby, Barker Mathematical Scholar, and H. K. Archdale, Woolley Classical and Philosophical Scholar, the three gentlemen selected, will travel to England by the Orient Line R.M.S. *Omrah*.

THE asylums committee of the Surrey County Council has addressed a circular letter to boards of guardians in the county stating that provision has been made to receive, on and after September 1st, some 36 paying patients from the county of Surrey at the new County Lunatic Asylum at Netherne, Merstham, at rates from 25s. a head a week. It is believed that this course will check the number of patients claiming admission to the asylum as paupers, and the committee suggests that boards of guardians should carefully inquire into the financial position of all patients, with a view to preventing further abuse of the accommodation provided for the pauper class.

British Medical Journal.

SATURDAY, AUGUST 28TH, 1909.

THE REPORT OF THE MIDWIVES ACT COMMITTEE.

THE report of the Departmental Committee on the Midwives Act, which is summarized on another page, must be regarded on the whole as satisfactory. The Midwives Subcommittee of the Medico-Political Committee spent much time in reviewing from every point of view the whole working of the Act, and the memorandum of evidence which it drew up, and which appeared in the Supplementary Report of the Council, set out at length the points in which the Association considered the Act required amendment. The fact that the Departmental Committee contained no representative of general practitioners, though it did contain representatives of every other interest, ought to convince the most sceptical that in granting the chief demands of general practitioners the Committee was in no way biassed. At the same time, it is perfectly clear that the Committee would have been all the stronger in discussing certain details if it had contained a member fully conversant with general practice. The reception accorded to the witnesses for the British Medical Association was most cordial, and the keen cross-examination through which they were put was welcomed as showing a full appreciation of the value of their evidence in matters affecting the community; and, though we shall have to criticize some of its findings, it is in no captious spirit, for we fully recognize the evident desire of the Committee to be fair all round.

In unanimously recommending that the State should guarantee a fee to medical men answering the call of midwives in emergencies, the Committee has formally sanctioned the great principle that services rendered by the profession to the community should be paid for by the community. This principle, so obvious in theory, but so difficult to establish in practice, has had to be fought for by the British Medical Association against a whole army of vicarious philanthropists. It has still to run the gauntlet of Parliament, though we can hardly imagine that the Government can hesitate to press on the Legislature a principle recognized by its own committee as equitable; it is, indeed, strange that its equity should ever have been disputed.

Another fact recognized by the Committee is that general practitioners have some rights which Government departments ought to regard. This is shown in the recommendation that a general practitioner nominated by the British Medical Association should have a seat on the Central Midwives Board, and that they have "superior claims to act as "examiners for the board."

A third point in which the Committee acceded to the wishes of the British Medical Association was that the fees to be paid "should be fixed, by order of the "Local Government Board, on a systematic basis, "having due regard to local conditions." The Midwives Subcommittee of the Association felt that to fix a fee by Act of Parliament would practically prevent any regard being paid to local conditions or to any future alterations in the rules of the Central Midwives Board. An order of the Local Government Board can be altered at any time as circumstances require, whereas experience shows there is the greatest difficulty in altering an Act of Parliament. The arrangement, too, will prevent to some extent the numberless disputes with local authorities, which "think in thousands of pounds" in some matters, but when the medical profession is concerned are often seized with a spirit of parsimony. As to the amount of the fee, the Committee makes no recommendation of any sum, but apparently favoured one guinea for all cases, under the idea that simple cases would compensate for difficult cases. That could hardly be the case, as *ex hypothesi* practically all the cases are difficult. But probably opportunity will be given for further representations on the matter to the Local Government Board. Another point granted is that the fee is to be paid by the local authority on the statement of the medical man "that he has been unable to obtain pay-"ment of his fee from the patient or her representa-"tives." There is no intention that the doctor should be put to the extremity of taking county court proceedings before the authority pays his fee. This, at any rate, seems to be the natural interpretation from the wording of the recommendation, though the point will have to be kept in mind when legislation is proposed. It would be intolerable were an authority to refuse a fee on the ground that the doctor had not fully exhausted every legal measure to recover it from the patient.

An important point raised in the examination of the witnesses was whether if the State guaranteed a fee, it ought to have a reciprocal right to compel under legal penalties the attendance of any medical man summoned by a midwife, physical obstacles alone being excluded. It was pointed out that, even if a fee were offered, no profession would acquiesce in any such compulsion to render its services whenever called on, and, moreover, that it would be impracticable to make any such enactment, as some medical men—for instance, specialists in other branches than midwifery, consultants, and practitioners who had given up midwifery—could not be expected to attend a midwife's summons. The only way was to circulate to midwives a list of medical men who had previously expressed their willingness to attend. This suggestion was finally adopted as one of the Committee's recommendations, but we are bound to point out that medical men will need to be extremely careful in signing any undertaking to attend whenever summoned, or they may assume a serious responsibility. It may possibly be found advisable, if this suggestion of a list be carried out, that the Association should take legal advice as to the form of such undertaking. It is evident that there is some ground for fear that an attempt may be made to put the profession under some legal obligation to go to cases whenever summoned if there is no physical obstacle; probably this would not stop at midwifery, but would be extended to all cases in which the least urgency could be pleaded. All the four witnesses were somewhat severely questioned as to the inhumanity of medical men in refusing to attend without a guarantee of a fee. Dr. Smith Whitaker put the matter that though in individual cases refusal to attend might not always be justifiable, "what we resent is the idea that the community should rely on the sense of humanity "in the medical practitioner as a means of compul-"sion to compel him to do work gratuitously."

Dr. McManus gave some striking instances in which he himself had been thus exploited. Dr. Flemming also related similar experience, and Dr. Taylor felt bound to remind the Committee that what it had to face was not the theoretical or logical question as to whether doctors were humane or inhumane, but the practical question, Could the Act be properly carried out without the co-operation of medical men, and would that co-operation be forthcoming under present conditions? On the whole the witnesses made it clear that things have got to such a pass that to mince matters further is useless; unless the present conditions are altered the Act will be a failure. No one would regret this more than the members of the British Medical Association, but medical men simply cannot live on what they give away. It is plain from the findings of the Committee that the arguments of the witnesses had much weight on this matter, as could not fail to be the case with practical men.

A further point, on which the Committee appeared to agree with the British Medical Association, was that the standard of examination for midwives ought not to be lowered at present. The suggestion for annual licenses on a modified examination was not received with favour either by the witnesses or the Committee; and though it was thought right to leave the matter to the discretion of the Central Midwives Board, it was on the distinct understanding that any examination shall ensure that the women certified shall be "safe and competent midwives."

Some regret will probably be expressed that the Committee did not accede to the request of the Association and of the Central Midwives Board, that the payment of fees should be dealt with by the health authorities rather than the guardians. Dr. Downes, however, pointed out that in the event of a reform of the Poor Laws, some weight must be attached to the arguments of the Majority Report of the Poor Law Commission, which go to show the danger that might result from giving such work to the sanitary authorities. There can be no doubt that these facts ought to weigh in making any permanent arrangements. The Association and the Central Midwives Board, in making their request, did so in view of present conditions of the Poor Law service, especially its deterrent aspects, which may prevent parturient women accepting aid from the guardians, even when it is important that they should have such aid. Of course, the Committee could say nothing definite about the reform of the Poor Law, but it seemed to be taken for granted that some reform would come before long, and the witnesses agreed that there could not be any objection to a reformed public assistance authority undertaking the payment of the fees.

On another point we fear that a serious mistake has been made, or rather, that unless every precaution is taken in drafting any amendment of the Act, there is a risk that great injustice to medical men will result. The Association asked that any fee paid should only cover attendance at the actual emergency, and "should not include any subsequent attendance 'nor relieve the midwife of the charge of her patient." The Committee, however, recommends that the fee should cover any ordinary after-attendance." Everything here depends on the interpretation of the word "ordinary." An ordinary attendance on a case of puerperal fever might extend to several weeks or months, and might include curetting or other more serious operation, and it would be a distinct hardship if a doctor were expected to give such attendance for a fee of one or even two guineas. It is quite certain that, unless the responsibility subsequent to attendance on the emergency be properly defined so as to prevent hardship, there will be serious risk of annulling the beneficial effects that other recommendations of the Committee would have.

Reviewing the report as it directly affects medical men, it is undoubtedly a distinct move in the right direction. If the Act be amended in accordance with the recommendations, it will go a long way towards ensuring that its beneficent intentions shall be realized.

THE RESULTS OF NERVE DIVISION.

IN *Brain* (vol. xxxi, p. 324 et seq.) Dr. Head and Dr. Rivers record in detail the sensory changes observed during a long period of recovery following the excision of short pieces of the radial and musculo-cutaneous nerves near the elbow. Dr. Head had decided to make himself the subject of observation in order to obtain reliable data, owing to the difficulties in the way of eliciting the required information from patients suffering from accidental nerve division. Such untrained subjects do not possess the necessary power of introspection to interpret what they feel, nor can they afford the time necessary for an extended series of observations.

The operation was carried out by Mr. Dean, assisted by Mr. Sherren, on April 25th, 1903. On the morning after the operation the radial half of the back of the hand, the dorsal surface of the thumb, and extensor aspect of the forearm were insensitive to stimulation with cotton-wool, pricking with a pin, and all degrees of heat and cold. The area insensitive to cotton-wool extended slightly further towards the ulnar aspect of the back of the hand than that of cutaneous analgesia, and between the two lay an area of hyperalgesia, but on the anterior surface of the forearm the loss of sensation to prick and to cotton-wool corresponded exactly. The most striking fact was the preservation of deep sensibility of the whole of the affected area to touch with the finger or a pencil, so that an unskilled observer would have overlooked the presence of cutaneous anaesthesia.

Deep sensibility is, in fact, independent of the cutaneous nerves, and travels most probably by those afferent nerve fibres which, as Sherrington had shown, lie in the muscular nerves. This discovery was at the time quite novel, but, in view of Head and Sherren's previous work on deep sensibility, not entirely unexpected. The recovery of other forms of sensibility returned gradually, though not simultaneously, over the whole affected areas; thus 56 days elapsed before the thumb responded to a prick, 86 before it responded to cold, and 161 before it reacted to stimulation of its hairs, while sensibility to heat was later in its return (166 days), and, like sensibility to cold, was found to be associated with definite spots.

The last form of sensibility to return was light cutaneous tactile sensibility, and its return possessed such characteristic features that it must be regarded as a separate variety of sensibility; moreover, there was a small area from the first that possessed this form of sensibility, but was insensitive to pain, cold, and heat. It possessed, however, deep sensibility.

To summarize the results, we may say that from the first there was present deep sensibility; then the stage of protopathic sensibility; and, finally, epicritic sensibility returned.

Protopathic sensibility implies response to heat and cold over heat and cold spots (but there is no reaction to temperatures between 26° and 37° C.), response to tactile hair sensation and hair pulling, and to pricks. The tests were carried out by Dr. Rivers, Dr. Head keeping his eyes closed during the examination; every influence that might disturb the passivity of the subject had to be eliminated, and Dr. Head was never allowed to know by suggestion what was being done or to know whether his answers were correct or otherwise. All his answers were the direct result of introspection exercised during the period occupied by the application of the stimulus, for it was discovered that like most people Dr. Head is a strong visualizer—that is, while he can reproduce the image of a thing seen with such accuracy that it can be searched for details, he cannot reproduce any other sensory impression in the same way.

The methods of examining cutaneous sensibility and painful spots, etc., are fully described in the paper. The complete analysis may be studied under the subdivisions of deep, protopathic, and epicritic sensibility, and a short account of the more definite results is of interest, not only owing to the new conceptions to which the reader is introduced as to the nature of sensation, but because it shows that these conditions are real entities and not stages in recovery, gradually merging into normal sensibility.

Deep sensibility requires careful distinction, as already mentioned, owing to the liability of its being mistaken for cutaneous sensibility. It consists in the power of appreciating moderate pressure, roughness of an object, and localization of a touch sufficiently heavy to cause a sensation. Head and Sherren had previously shown that the recognition of passive movements was possible when the nerves to deep parts were alone intact. When deep sensibility is alone present excessive pressure will cause pain. Discrimination between the two points of a compass is impossible if they are applied to the skin simultaneously; there is no sense of shape on contact with an object, nor is there any power of appreciating differences of temperature. It may be readily shown that the pain on heavy pressure is due to deep sensibility by pinching up a fold of the skin, when no sensation is felt.

The study of protopathic sensibility forms one of the most interesting chapters of the whole paper. As regards painful cutaneous stimuli, the back of the hand became sensitive eighty-six days after operation. The minimal stimulus or threshold as measured by von Frey's hairs was higher at first than over a corresponding area of the normal hand, but diminished after a considerable period, eventually becoming slightly less than normal, but there was no preceding sense of contact with a sharp point. Certain spots called pain spots can be mapped out over a protopathic area, but they are very numerous, increasing in number with the intensity of pressure. The pain produced is diffuse, and referred to distant parts of the protopathic area—for example, from the hand or wrist to the forearm—and it is more unpleasant, and was usually said to be more painful than the pain produced over normal skin, although the minimal stimulus required was, as already mentioned, not greater than in the case of normal skin. Sensibility to heat and cold was found to be dependent on and limited to the area of heat and cold spots. The former are less numerous than the latter, and both are present in normal skin, but heat and cold sensibility in normal areas is not limited to these spots, so that we may conclude that temperature sensibility is ordinarily dependent on two varieties of end organs. The cold spots are, at any rate, specific, inasmuch as they can be stimulated to give a sensation of cold by the application of heat at a temperature of 45° C. As in the case of pain, stimulation of heat and cold spots is more intense than such stimulation in normal tissues, but nevertheless the limits are more restricted, for no sensation of temperature results in protopathic areas by application of rods between 26° C. and 37° C. Radiation and reference are the rule, just as for pain sensibility. In normal skin the areas between the protopathic temperature spots are sensitive to a much wider range, but require the application over a larger area, such, for example, as a test tube would afford. Normal skin exhibits a wide range of adaptability to heat or cold, so that, after placing the hands in warm water, a test tube of water that under ordinary conditions gave a sensation of heat now feels cold, and vice versâ. This adaptability is practically entirely wanting in the case of protopathic areas. Reference has already been made to another feature of the protopathic condition, namely, hair sensibility or reaction to pulling the hairs and stroking hair-clad parts with cotton-wool. This form of sensibility is quite independent of ordinary tactile sensibility and stroking with cotton-wool produces no sensation after shaving the hair. It appears later than sensibility to prick or application of cold; it presents the peculiarities of protopathic sensibility in its being diffused locally and referred to distant parts. Its independence of ordinary tactile sensibility is proved from the circumstance of its disappearance when the skin is first shaved, and then stimulated with cotton-wool. The features of protopathic sensibility are exactly reproduced in the skin of the normal glans penis, a fact which cannot be altogether a surprise, for we must all be more or less familiar with its insensibility to light touch; but we owe to Dr. Head the demonstration of the other features of protopathic sensibility. We may conclude from this fact and also from the occasional persistence of protopathic sensibility for many years in an area of recovery that this form of sensibility is due to a special mechanism in the skin, and not to a defective restoration of the mechanism of sensation.

The return of epicritic sensibility first made its appearance 366 days after the operation in the proximal part of the forearm, but the improvement here as elsewhere was apt to recede when the weather became cold, or when the part was artificially cooled by immersion or other means. It required 567 days for epicritic sensibility to return to the greater part of the hand; but even after five years there remained a portion of the back of the hand between the knuckles of the index and middle fingers insensitive to all epicritic stimuli; here the threshold for pain was identical with that over a normal area, but it was much more unpleasant, it radiated widely, and was localized in remote parts.

Epicritic sensibility consists in the recognition of the "pointedness" of a needle or pin, which involves the power of distinguishing the point from the head, response to temperature between 26° and 37° C.; spacial discrimination as tested by the simultaneous application of two points of a compass, and diminished pilomotor reflex (which is exaggerated in the protopathic stage). The return of epicritic sensibility inhibits the tendency to refer stimuli to remote parts and introduces less vivid sensation restricted to the immediate neighbourhood of the point of contact. There is, accordingly,

along with the introduction of cutaneous sensibility to light stimuli—for example, stroking the part, after shaving in the case of a hair-clad part, with cotton-wool—abolition of the diffused and referred sensations so characteristic of protopathic sensibility. The skin is, in fact, supplied by two anatomically distinct systems called "protopathic" and "epicritic," which regenerate at different periods after complete nerve division. All epicritic organs have a low threshold, protopathic organs have a high threshold; the threshold for pain is, however, the same over normal and highly protopathic parts—that is, parts that have been in the protopathic stage for a long period—but contact with a sharp object produces pain alone in protopathic areas, whereas in normal areas pain is preceded by a sense of contact with a pointed object.

Internal organs of the body are probably innervated from the deep and protopathic systems; their sensibility is evidently low; heat and cold spots must be scanty, or even absent, from most parts of the stomach and intestine, and they are totally devoid of epicritic sensibility. A stimulus consisting of pressure or muscular movement may therefore be correctly localized (deep sensibility), but when the stimulus evokes pain the sensation will tend to be referred to remote parts, just as occurred in the case of the protopathic part of the affected areas in Dr. Head's case, while the protopathic condition persisted.

THE HOUSING BILL AND THE MEDICAL SERVICE.

AMONG the bills which the Government has decided to attempt to pass this session is, as we stated to be probable last week, the Housing and Town Planning Bill; and as at present arranged it will be considered in Committee of the whole House on August 30th and 31st, and may come up for third reading on September 10th.

When the bill passed through a Standing Committee of the House last session, there was added to it an important clause—30—which provides for the systematic inspection of the houses in every district at least once in every five years, and also—which is of paramount importance—that a record shall be kept of the conditions which are found upon inspection. In every well-administered sanitary area such an inspection is already made and every medical officer of health of experience attaches the highest importance to "house-to-house inspection." The duty of making the inspections is cast by the bill upon the metropolitan borough councils and county boroughs and urban districts having a population of over 10,000 and elsewhere upon county councils. There will doubtless be some difference of opinion as to the last named authority being entrusted with the duty of inspection instead of the rural and small urban authorities, who already have the necessary staff to carry out the work, whereas the county councils would have to make entirely new appointments.

In one other particular the bill was amended in its passage through the Standing Committee. It was provided that a medical officer of health of a county should not be appointed for a limited period. So far as we are aware, a county medical officer of health never is or has been appointed for a limited period, although, as is well known, the contrary is the case with medical officers of health of districts, whose usefulness for years has been impaired owing to the periodical lapsing of their appointments and the uncertainty of their re-election. Those who consider that the county official should be removable from office only with the consent of the central authority, but that the district official should continue to be subject to the risk of capricious removal by the district authority, may be reminded that the duties of the county medical officer are purely administrative and general, whereas those of the district officer are executive and particular. He it is who has to come to close grip with the local authority and with individuals, and in doing so he must of necessity come into conflict with private interests. Indeed, if there is one official more than another who should be protected in the carrying out of his duties it is the district medical officer of health. We trust that when the bill is debated next week full opportunity will be given for placing the full facts before the House, when we have every confidence that district medical officers will be placed in the same position as that which it is admitted should, in the public interest, be accorded to county officers.

INCREASED DIRECT REPRESENTATION.

THE Medical Act of 1886, which put an end to a variety of inconsistencies, contained a clause rendering an increase in the number of Direct Representatives of the profession possible. It even went so far as to arrange the machinery for securing this addition, and merely left the General Medical Council to move the lever at its will. Until this year, however, the General Medical Council showed little disposition to use this power, in spite of its knowledge that there was a strong feeling among medical men resident in England and Wales that they ought to be further represented. On sundry occasions the feeling in question was reduced by existing Direct Representatives to the concrete form of definite motions, which, though strongly advocated by, among others, Mr. George Brown, Mr. George Jackson, Professor Saundby, Sir Victor Horsley, and Sir Thomas Myles, were rejected. This year the British Medical Association asked all Divisions within whose area a member of Council resided to address him on the subject, and on May 25th a resolution in favour of one being added to the number of Direct Representatives of medical men resident in England and Wales was carried. It was moved by Dr. Langley Browne, seconded by Dr. McManus, and supported by Dr. Latimer. Only five members voted against it, though eight refrained from voting either way. Thereafter nothing remained but to make the necessary application to the Privy Council, and the *Gazette* of August 20th contained an announcement that the King has assented to the proposal. It will take effect at the next ordinary election of Direct Representatives, when medical men resident in England and Wales will have to elect four instead of three Representatives as heretofore. The original motion proposed immediate election, but the mover accepted an amendment that in order to avoid the great expense of an election the addition should not be made until the next ordinary election. All those who have worked for the accomplishment of this end are to be congratulated, for the addition was certainly required. At the beginning of this year the proportion of Direct Representatives to medical men in England and Wales was only 1 to 8,389, against 1 to 3,845 in Scotland, and 1 to 2,656 in Ireland. The General Medical Council, constituted by the Medical Act of 1858, was formed mainly of representatives of licensing bodies, but the propriety of securing something like independent representatives of the medical

profession seems to have been appreciated at that time, for the Act prescribed that of the six nominees of the Crown four were to be chosen from medical men resident in England, and one each from those in Ireland and Scotland. Under the Act of 1886 the Crown nominees were reduced to five, and the stipulation as to residence omitted, but, on the other hand, it was ordered that five Direct Representatives of the medical profession should be elected, three for England and Wales, one for Ireland, and one for Scotland.

PHYSICAL EXERCISES IN ELEMENTARY SCHOOLS.

THE Board of Education has had under revision the official *Syllabus of Physical Exercises for Public Elementary Schools* issued in 1904, and reprinted with slight alterations in 1905; the revised syllabus[1] will be published about the third week in September next, but in view of the fact that a special summer course is being organized by the Board for the benefit of certain members of the teaching staff of certain training colleges, some advance copies of the revised syllabus have been printed off, and we have been favoured with one of these. In an introductory chapter on general principles, special stress is laid on the important physiological effect of physical exercises in promoting functional activity of the various parts of the body, directly or indirectly. The second chapter consists of general directions to teachers, and the third describes simple exercises and positions and affords practical illustrations of the principles laid down in the first and second chapter. The fourth chapter deals with marching, running, jumping and breathing exercises, and the fifth with the arrangements of the class. In the sixth chapter the order and progression of exercises are discussed, and it is pointed out that the following fundamental principles must always be kept in mind by the teacher: "(1) The "exercises must be selected for their nutritive, cor- "rective or developmental effects on the body as a "whole, and not merely to encourage the enlargement "of certain muscles. (2) The exercises must be "adapted to the age, physical condition, and general "requirements of the pupils. (3) They must be "arranged on a certain definite, systematic plan, each "exercise having its special object in the lesson in "order that the greatest effect may be obtained within "the available time. (4) The physical training must "be above all things progressive, and this progression should be maintained throughout the entire period." The next chapter, which occupies over fifty pages, consists of detailed instructions for exercises arranged in series of tables suitable for children at the ages of 7 to 9, 9 to 11, and 11 to 14 years. There are five appendices, the first on supplementary physical exercises, the second on class-room exercises, the third on physical exercises for infants, and the fourth on a suitable dress for girls, while the fifth consists of suggestions on the construction of tables of exercises. It may be said at once that the publication is very well printed on glazed paper, so that the large number of photographs of children doing the various exercises by which, in addition to diagrams, the instructions are illustrated, are very clearly reproduced. With regard to infants—that is to say, children under 7 years of age—the book contains some very excellent and common-sense observations; it is pointed out that whereas in very young children the natural free movements supply all that is required, this instinct is restricted when they enter school, and must be compensated by frequent opportunities for free movement, which should generally take the form of play. The lessons, if they should be so called, must be extremely short and varied; the infants should not be expected to sit still for long, should not be allowed to stoop over their work, and should not be given work on a small scale, such as fine sewing or writing between narrow lines. Sir Robert Morant, in a short prefatory memorandum, says that the Board does not feel called upon to encourage mere conformity to gymnastic standards, and insists that all lessons in physical exercises should be thoroughly enjoyed by the children, freedom of movement and a certain degree of exhilaration being essentials of all true physical education. In this connexion it is advised that suitable games should be encouraged, including skipping and dancing exercises, upon which some notes are given in the first appendix. In the discussion of general principles special stress is laid upon the necessity for giving attention to the needs of the individual child, and should a child not develop normally, of submitting him to medical examination by the school medical officer. The syllabus marks a distinct advance, not only in the details of the exercises, but in the spirit by which the introductory chapters are informed. Again and again the great fact is impressed on the teachers that the child must be studied as a living, growing creature—growing in mind and body—and that excellence in the one cannot be successfully cultivated if the other be neglected. Most teachers are already well aware of the truth of this principle, but it is difficult to break with old habits and ways of thought. We hope that the syllabus, when published at the end of next month, will quickly find its way into the hands of every elementary school teacher, old and young.

[1] *The Syllabus of Physical Exercises for Public Elementary Schools.* 1909. London: Eyre and Spottiswoode, Ltd., or Wyman and Sons, Ltd.; Edinburgh: Oliver and Boyd; Dublin: E. Ponsonby. To be purchased through any bookseller, price 9d. (Demy 8vo, pp. 176).

IRISH INDUSTRIES AND CONSUMPTION.

FOR some time past rumours have been circulated throughout Ireland, and have even found their way into the newspapers, that the public attention which had been drawn to the existence of tuberculosis in Ireland was in a measure injuring the industries of that country by making people afraid to purchase Irish materials lest they might convey the disease. Her Excellency the Countess of Aberdeen, the President of the Royal Irish Industries Association, which she established, and the President of the Women's National Health Association of Ireland, which she also initiated, wisely determined to meet these absurd statements, and fortunately the annual meeting of the Royal Industries Association, at which she occupied the chair at Dublin on August 19th, gave her the opportunity of emphatically denying that there was the least ground for the theory that there had been a diminution in the sale of lace and crochet in the United States and Canada because of the health work that was being carried on in Ireland. On the contrary, the greatest interest was being shown in the work and in the effect it was having, so much so that a desire had been expressed that some delegates should visit Ireland and see for themselves what was being done. She was able to state, on the authority of the directors of the Irish Lace Dépôt, that there had actually been a distinct and definite increase in the trade, and especially with the United States and Canada, during recent months. While recently when on a visit to Canada she had noticed one great store in Montreal full of Irish goods, with placards in the windows directing attention to the fact. But, with her usual practical good sense, Her Excellency determined to give a demonstration in order to dissipate the idea that there could be any possibility of infection being conveyed by these goods; so, on August 20th, at her suggestion, a large company,

including a number of the medical men of Dublin, visited the depôt, and were made acquainted with the conditions under which the work is carried on and with the methods adopted for the disinfecting of all goods. The medical men present who had inspected the place being asked to give their opinions on this subject, Sir Francis Cruise said he had seen the means taken in the dépôt to prevent any danger of infection, and in his opinion the work sent up from the poorer parts of the country was disinfected in a most absolutely perfect way. Sir Charles Cameron endorsed what Sir Francis Cruise said. There was no doubt, he said, that clothing was occasionally the medium of spreading infectious diseases, especially scarlet fever, but there was less scarlet fever in Ireland than in England or Scotland. He was quite satisfied that there was not the least possibility that any article treated in the way followed at the dépôt could convey infection to anyone. It was well to realize that, because one-third of the total quantity of lace exported from Ireland came through that emporium. Lady Aberdeen pointed out that the output of lace and crochet work in Ireland was about six times as much now as it was twenty years ago, and for the past ten years the wages bill for workers amounted to between £250,000 and £300,000. It was also stated at this meeting that in the event of infectious disease appearing in the homes of those producing lace in the West of Ireland in connexion with classes under the Congested Districts Board, notification was at once made to that Board's inspector. It is hoped that after this thorough and practical proof that there are no reasons for a scare about Irish materials conveying the germs of consumption, those who circulated these rumours without in any way examining the facts will publicly withdraw their statements.

THE TERRITORIALS ON SALISBURY PLAIN.

THE whole of the 2nd London Division Territorial Force, with the exception of the engineer units, the cyclists, and the two general hospitals, have this year had their annual training at West Down Camp, North and South, Salisbury Plain, and recently returned after a fortnight's useful and instructive work. The medical units were encamped at West Down North, and comprised the 4th, 5th, and 6th Field Ambulances and the 2nd Sanitary Company, which all mustered very satisfactorily, the greater number of officers and men remaining in camp the full fifteen days. The main object of having the medical units in camp is for their own instruction, but they are also expected to look after the health of all the troops in camp, and in order to cope satisfactorily with the accidents and emergencies that might arise the 4th and 5th Field Ambulances established a non-dieted hospital on the North Down where the artillery were encamped, and the 6th a similar hospital on the South Down, where there were fourteen battalions of infantry; the medical officers of both were kept well occupied, and though there were fortunately few serious cases, and these were speedily forwarded to the military hospital at Bulford, a large number of minor ailments were dealt with and the men returned to their battalions. Most of the ailments were due to the excessive heat of the second week, but there were a considerable number of cases of sore feet; there were very few cases of sore throat, and though an incubator had been provided to make cultivations in doubtful cases it was not found necessary to use it. The three field ambulances worked separately, being instructed by their own officers, except on one day in the fortnight, when each had the help of the school adjutant and his staff. It is to be hoped that another year the division will have its own school and adjutant, and not have to share with the 1st Division and Mounted Brigade, as is now the case, for more can be learnt in the fortnight in camp than during the rest of the year. Notwithstanding this drawback, however, the men made excellent progress, and before they left, the majority had a fair knowledge of field work, and were able to pitch and strike their field hospitals, arrange their dressing stations, render first-aid to and convey from the front wounded men, in an expeditious and satisfactory manner, and in necessary cases make the preparations for operations in the field hospital. On one occasion—a very hot day—when the attack was being practised by three infantry brigades combined, two field ambulances sent out with them had a very realistic experience, for a number of men, one after another, fell as if they had been hit by a bullet, overcome, as it seems, by the heat. The stretcher parties were on the alert, and conveyed the fallen men to the field hospital, where they received appropriate treatment, and the majority were able to march home with their battalions, the remainder being carried in the ambulance wagons. Another novelty to most of the men was introduced this year. On two occasions a mobile column was sent out with its transport, commissariat, etc., and bivouacked at Netheravon, returning the next day; on each occasion it was accompanied by a field ambulance, and though the medical work was practically nil, the experience gained was very valuable. The Sanitary Company did useful work, besides acquiring much useful information, both theoretical and practical, as to what it is expected to do. Every morning an officer and a squad of men attended the ration board and inspected the meat. Squads also visited the various camps, and were instructed in their duties in connexion with camp sanitation and their relations to regimental fatigue parties. Squads also accompanied the mobile columns, and their services, especially in connexion with the water supply, were found very useful. The men were also exercised in building refuse destructors in their various forms with bricks, earth, etc., in preparing the various forms of camp kitchens, the preparation of trenches for the disposal of excreta, and for the prevention of soil pollution in connexion with kitchen refuse, both solid and liquid. Opportunity also occurred of demonstrating the practical method of tent disinfection, as on the second day of the camp a case of measles occurred, and the men saw the proper steps taken to prevent any spread of the disease. It may also be mentioned that not only the Sanitary Company but also between twenty and thirty men of the 6th Field Ambulance—which, having completed its establishment, has already enlisted men for regimental water duties—were fully instructed in the use of the field service filter tank, as well as other methods of purifying water. The camp of 1909 will not soon be forgotten, for, not only was it very instructive, but the weather conditions of the fortnight were an agreeable contrast to the rest of the summer; though most of the troops arrived in the rain, no more fell during the fifteen days.

THE LIABILITY OF HOSPITALS.

BY a coincidence there were published last week (August 21st, page 501) accounts of two actions directly bearing on a question to which fortunately a legal test has not been often applied—namely, whether damages can be exacted from a charitable institution for an injury shown to be due to carelessness. In each of them the ground of action was an alleged injury of a patient by a hot-water can during operation

From the detailed judgement of the Appeal Court in one of these actions, it would appear that the implied contract between a patient and the governors of the hospital whose portals he enters is strictly limited; the governors do not undertake to treat and nurse the patient, but merely to employ other persons to do so. Hence, provided they can show that they have exercised reasonable care in the choice of such persons, they are free of all liability for any carelessness or inefficiency alleged to have occurred. It is true that the governors of a hospital are responsible, like other people, for the acts of their agents and servants, but in the majority of cases in which actions for negligence are brought against hospitals the alleged injuries arise out of work done by persons who are either never the agents or servants of the governors, or who cannot be regarded as having been their servants at the moment of the alleged careless or inefficient work. In this connexion the Court of Appeal laid down that members of the medical and surgical staffs of a hospital were never the servants of its governors; they were liable to be discharged from their office by the governors, because the governors were responsible for the control of the institution in which they worked, but the way in which they did that work was a matter in which the governors could not interfere, and for which, therefore, they were not responsible. Allied considerations apply to other professional employees, such as nurses. These in a general way are the servants of the governors, and to that extent the governors are responsible for anything they may do; nevertheless, so soon as they begin to take part in an operation or other treatment of a case under the orders of a member of the medical staff they cease to be servants of the governors, and the latter incur no liability towards a patient through their conduct. This decisive enunciation of the law by the Appeal Court is of considerable interest, for during the past few years there has been apparent a certain tendency for aggrieved patients to threaten reprisals against institutions which have extended to them their hospitality. This judgement, however, makes it clear that the occasions on which such actions can be brought successfully must be exceedingly few.

A FRESH RIVAL FOR GENERAL PRACTITIONERS.

PROBABLY no greater compliment to preventive medicine has ever been paid than that which is forthcoming from sundry life insurance societies in the United States. Some of them are seriouly considering the desirability in their own interest of bringing the more individual methods of preventive medicine to bear on their own clients with a view to lessening their expenditure by postponing the date at which they will be called on to pay up sums insured. One of them has already established a department specifically devoted to this purpose, and proposes to get into touch with all its policyholders and to keep them coached up in ways of preserving their health. Its plans include an arrangement by which the policyholders can, if they desire, be overhauled by the society's own medical officers from time to time, receive warning as to any weak points and advice as to how to avoid ill consequences, and, generally speaking, defend themselves against the wear and tear of life and the risks of advancing age. Actual medical treatment, commonly so called, does not nominally come within purview of the new department, but it is clear that work of the kind in question is scarcely distinguishable from it. It has yet to be proved that an insurance society can effectively engage in an enterprise of this sort and improve thereby the life-expectation of the general body of its policy holders to such an extent as materially to reduce its own expenditure, and no conclusion on this point could be drawn before the plan had been in operation for at least ten years. It is clear, however, that should the policy eventually prove to be one of real financial value it is capable of indefinite extension and might be taken up by insurance societies in Europe. That result would mean the introduction of a further great addition to the various forces which at the present time are rapidly changing the practice of medicine as a whole and annually increasing the difficulties by which medical men in general practice already find themselves faced.

THE PROPERTIES OF THE CANCER CELL.

AN essay on the specific properties of the cancer cell, by Drs. Hess and Saxl, forms the first of a series of reports on cancer research which is being published under the editorship of Dr. Salomon.[1] From their observations on the proteolytic ferments of malignant tissue, the authors find themselves at variance with the view that the cancer cell possesses a special proteolytic activity which distinguishes it from all other cells of the body. They maintain that the proteolytic ferments of cancer cells are similar to those possessed by normal cells, and hence they do not regard the peculiar features of malignancy and its associated cachexia as attributable to the action of special ferments. The authors also record certain experiments in which they have found that phosphorus, whilst producing fatty degeneration of normal adult tissue, does not bring about this change either in embryonic cells or in the cells of malignant growths. These observations support the anatomical evidence of a biological parallelism between malignant and embryonic tissue.

DEATH OF DR. RADCLIFFE CROCKER.

WE have to announce with profound sorrow the sudden death, on August 22nd, while on a holiday at Engelberg in Switzerland, of Dr. Radcliffe Crocker, Physician to the Skin Department of University College Hospital. Dr. Crocker had won a foremost place among physicians engaged in the speciality to which he devoted himself, but his death will cause a special sense of loss to the members of the British Medical Association who knew the energy with which he gave his great organizing abilities to the work of the Association. He was Honorary Secretary of the Metropolitan Counties Branch from 1889 to 1891, represented that Branch on the Central Council from 1890 until 1904, and was elected Treasurer of the Association in 1905. We hope to publish a full biographical notice in a subsequent issue.

CHOLERA IN HOLLAND.

IT has been proved by bacteriological examination that the deaths of four children in Rotterdam, at first attributed to eating poisoned sweets, were in fact due to Asiatic cholera. The source from which the infection was derived does not appear to have been ascertained, but a Dutch steamer from St. Petersburg arrived in the port of Rotterdam on August 13th with cholera on board, and was detained at the quarantine station at Naaldwijk. The captain of a ship has died in the port from an illness which has raised a suspicion of cholera. The disease has been present in Russia for several months

[1] *Beiträge zur Carcinomforschung.* Herausgegeben von Dr. H. Salomon. Heft 1. *Zur kenntnis der spezifischen Eigenschaften der Carcinomzelle.* Von Leo Hess und Paul Saxl. Berlin und Vienna: Urban und Schwarzenberg. 1909. (Sup. roy. 8vo, pp. 28, 2 illustrations in the text. M. 2.)

past to a serious extent, and at Riga this month two or three cases occurred every day. In the two weeks ending July 31st, 1,714 cases of cholera were notified in Russia, with 732 deaths. In Rotterdam some 25 persons, of whom 14 are children, are under observation. The precautions which have proved effective on previous occasions are being taken at British ports, and it is recognized that in view of the shortness of the passage from Rotterdam to the east coast of England and Scotland special vigilance is necessary.

Mr. S. G. Lushington, who has acted for some years as legal assessor to the General Medical Council, died last week in his fiftieth year. Mr. Lushington edited three editions of *Lumley's Public Health* and two of *Archbold's Lunacy*.

Medical Notes in Parliament.

[From Our Lobby Correspondent.]

The Massacre of the Innocents.—On August 20th the Prime Minister made his statement as to the bills to be dropped and those which must be passed before the session can close. The "innocents" sacrificed absolutely were the Welsh Disestablishment Bill, the two Milk and Dairies Bills, the Building and Engineering Works Bill, the Houses of Parliament Bill, and the measures dealing with shops, hops, county courts, London electric supply, and the enfranchisement of places of worship. The controversial bills that must, he said, be passed were the Finance Bill, the Irish Land Bill, and the London Elections Bill. Among the seven bills which the Prime Minister sanguinely classed as non-controversial were the Housing and Town Planning Bill and the House-letting and Rating (Scotland) Bill. The latter occupied most of the afternoon of August 20th, and led to several divisions, in spite of its so-called non-controversial character, but finally passed its last stages. The Housing and Town Planning Bill will be considered early next week under a closure resolution, and will only be allowed two days for Committee and one day for report and third reading. If it passes without much change in the Commons, it is likely to be amended in the Lords, and so may, after all, have a perilous time before it. Mr. Asquith, with great hopefulness, mentioned other bills not yet introduced, which might be passed, including the Development Bill for carrying out some of the proposals of the Budget. Ten minor bills are to be dropped if seriously opposed, including the Lunacy (Ireland) Bill, and no facilities will be given to private members' bills unless they are generally accepted. The Scottish Temperance Bill, the Prime Minister said, had exceptional claims, and the Government hoped to pass it. There was, after the Prime Minister's statement, a more general feeling that September would see the end of parliamentary work, or nearly so.

Medical Officers' Duties under the Superannuation Bill.—Sir William Collins asked whether, in the event of the draft regulations prepared by the Treasury under Clause 3 of the Superannuation Bill becoming operative, medical officers attached to public departments would be required to fill up the forms prescribed in the draft regulations in regard to civil servants as part of their ordinary duties. Mr. Hobhouse replied that medical officers were employed under different conditions in different departments, and he was not at present in a position to make any general statement upon this question. The Superannuation Bill was read a third time in the Commons at the close of Thursday's sitting last week.

Workhouse Hospital Patients and Pensions.—Mr. Field asked the Secretary to the Treasury whether free residence and treatment in a union workhouse hospital would disqualify an old age pensioner; and whether an old age pensioner who had had to be removed to a workhouse hospital could draw his pension while there. Mr. Hobhouse replied that as regards the first part of the question, he understood that the view taken by the Local Government Board in cases which had been decided upon appeal was that disqualification did not arise when the medical or surgical assistance preponderated, and the maintenance was altogether subsidiary. On the other hand, when the medical or surgical relief appeared to be incidental to ordinary relief, the pensioner would be regarded as disqualified. Pension officers, in reporting upon such cases to the pension authority, were guided by these decisions. A pensioner who was not disqualified could draw his pension while in the workhouse hospital.

Daylight Saving Bill.—The Select Committee on this bill, which held its final meeting on August 24th, has reported against the bill and against any legislation of such nature on the ground that the principle if applied compulsorily would cause serious dislocation in certain industries, such as agriculture and railways. The chairman had drafted a report in favour of the principle of the bill, and the report as finally adopted contains the expression of a hope that the principle may be voluntarily adopted in cases where it is found feasible.

The Sick Poor in Hinckley Workhouse.—Last week Mr. Talbot asked the President of the Local Government Board whether his attention had been called to the report of Mr. Walsh, Inspector of the Board, on the condition of the sick poor in the Hinckley Union Workhouse, the insufficiency of the nursing staff, the mixture of children with adults in the sick wards and elsewhere in the workhouse; and whether he proposed to bring about a remedy for this state of things. Mr. Burns said that he was aware of the report referred to in the question, and he had for some time pressed upon the guardians the need for their making further provisions for the accommodation of the indoor poor of the union. In particular, he recently urged upon them forthwith to remove the children from the workhouse and to provide a temporary infirmary for the sick and a temporary laundry. This the guardians had now agreed to do, and he was in communication with them with respect to the details of the arrangements.

Chinese Pork.—In reply to Mr. Boland, the President of the Local Government Board stated last week that prior to the arrival of the carcasses in this country he caused inquiries to be made both of the importers and of the Consul-General at Hankow. The latter reported that the animals exported were entirely different from the ordinary scavenger pig, and were of a special breed fed on rice in the valley of the Yangtse. This agreed with the statement made by the importers. The carcasses were subjected to a strict examination under the Public Health (Foreign Meat) Regulations. A preliminary examination was made on the arrival of the ship. The carcasses were now in cold store, and were examined by the officers of the Corporation before they were placed on sale. Retail vendors were not required to disclose the origin of the pork.

Civil Service Candidates (Vaccination).—Mr. Pointer asked the Secretary to the Treasury what provision of the Order in Council of June 4th, 1870, gave power to the Civil Service Commissioners to demand proof of primary vaccination as a test for candidates for admission to the Civil Services, irrespective of conscientious objection. Mr. Hobhouse replied that the Civil Service Commissioners acted in this matter under the general powers given to them by the Orders in Council to test the qualifications of candidates for employment in the public service, and he was not prepared to interfere with this exercise of their discretion.

The Metropolitan Ambulances Bill.—This bill, proposing to impose on the London County Council the duty of instituting and maintaining an ambulance system for the removal of cases of accident or sudden illness occurring in the streets, was read a third time in the House of Commons on August 19th.

Scotland.

[From Our Special Correspondents]

Glasgow Royal Infirmary.

At the Glasgow Dean of Guild Courts, on August 19th, plans were passed for buildings in connexion with the Royal Infirmary, to cost £89,000. This is a further development of the great scheme of reconstruction and extension commenced fully two years ago.

Scottish Milk and Dairies Bill.

Amongst the "innocents" slaughtered by the Government this session is this bill. Further progress with this measure was postponed some time ago in order that the Government might make a statement as to financial assistance to be given by the State in respect of the destruction of tuberculous cows. The abandonment of this bill is to be regretted, as such a measure was greatly required.

Reversionary Bequest to Edinburgh University.

Dr. Edmund Wearne Clarke, Chesterfield, Derbyshire, has left the ultimate residue of his property to the Lord Rector, Chancellor and Senatus for the time being, of the University of Edinburgh upon trust, to found and endow a bursary to be called the Wearne Clarke Bursary, "in honour of my university and for the help of others that come after me in my profession."

Domestic Balconies.

At the end of last May the Stirling Medical Society by invitation submitted to the Public Health Committee of the borough a resolution stating that the immediate erection of a hospital for consumption was, on financial grounds, inexpedient. Since then Dr. John Drew has written to the papers in praise of the design of a brick building newly erected in Friar Street, Stirling. It has four stories on the street elevation and an exposure due south; an attic story faces the east. The three upper front stories have a recessed balcony built in the form of an inverted oriel; each is separated from the adjoining room by a partition with doors on either side, and is large enough to afford room for a bed, small table, and chair. On inspection during heavy rain he found the balcony practically dry, and he thinks that privacy could be secured by a sheet of metal lattice-work extending 3 to 5 ft. upwards from the sole of the window. He believes that the erection of such buildings would afford an inexpensive method of treating consumption and other tuberculous diseases, and could also be used for preventive treatment in children and for patients who after a course at a sanatorium require further supervision and treatment. There is no doubt that a good deal might be done in the direction suggested by Dr. Drew. Experience in open-air sanatoriums and hospitals has shown that British architects have been unduly deterred by the proverbial fickleness of the British climate from providing dwelling houses with balconies and verandahs. The chief fear has been the entry of rain, but it is surprising how completely a roof at a proper angle would protect even a narrow balcony from all but very hard driving rain. What the relation of the width of the balcony to the slope of the roof ought to be we cannot say, but it seems to be a point to which architects might give attention.

Ireland.

[From Our Special Correspondents.]

Queen's College, Cork.

In the report on the condition of Queen's College, Cork, for the session 1908–9, recently presented to Parliament, the President (Dr. Windle) states that the general work of the college has proceeded satisfactorily, and that all departments, with one exception, have been up to, or over, their usual number of students. The exception to which he alludes is that of Irish history, which during the past four years, since it was attempted to revive the teaching of that subject, has been most disappointing. In the first of these years four students entered for instruction, of whom two withdrew before the course had long been in existence; in the second year two entered; in the third year, and in the year which has just been completed, there have been no students at all. When the President reported previously on this matter the point was taken, in a speech by a very eminent Irishman, as an indication, not of an absence of interest in Irish in the Cork district, but of the unsatisfactory position which the college then occupied in relation to the public. During the past session this unsatisfactory relation has ceased to exist and therefore can no longer be cited as the reason of the failure of this department.

The fact of the matter is, the President remarks, that it must be regretfully admitted that the statements which I have made, and others who could be quoted in connexion with classes for the teaching of Irish in this city, conclusively prove that there is but little enthusiasm for the study of the language in this district. This conclusion is strengthened by the following fact: Four years ago Irish was made an alternative subject with other modern languages for scholarships, entrance or otherwise, in this college. During these four years no single candidate has ever presented himself or herself in Irish for any scholarship. It seems very disappointing that these facts, which have been very disappointing to me personally, should be made public at the present moment.

England and Wales.

[From Our Special Correspondents.]

WEST YORKSHIRE.

Bradford Municipal Sanatorium.

At a recent meeting of the Bradford City Council it was determined to acquire a site suitable for the erection of a sanatorium for the treatment of pulmonary tuberculosis in women. Fifty beds are to be provided, and in the choice of a site regard is to be had to its suitability for giving opportunity for graduated open-air labour. Some provision is already made by the city for the treatment of male tuberculous cases, and the Education Committee is held to be the proper authority to deal with children suffering from consumption. The Education Committee will probably provide a children's sanatorium in which a certain amount of tuition will be given to the inmates, Government grants being earned. It is thought that the cost of the new sanatorium for women will be about £15,000 and the annual upkeep probably nearly £6,000 a year. The whole cost to the ratepayers of the various sanatoriums will in the future be a very considerable burden, but it is hoped that, in addition to the prevention of a great deal of misery, they may conduce to civic fitness and indirectly to economy.

Bradford Fever Hospital Extension.

A new home for nurses and a new observation block in connexion with the Bradford Municipal Fever Hospital were opened last month by the Lord Mayor. The additions include a new mortuary and some other minor changes, and have altogether cost about £9,000. The hospital now has accommodation for 180 patients and 35 nurses and the building used in the past by the nurses will be utilized as quarters for the domestic staff.

Proposed New Infirmary for Bradford.

The proposal for a new general infirmary for Bradford, which has been talked about for a considerable time, has now taken concrete form. The Lord Mayor has issued an appeal for £100,000, which is to be raised before any building operations are undertaken. Three local gentlemen have each promised £5,000, and there is little doubt that with a determined effort, the remainder of the £100,000 will be quickly raised. Any one who is acquainted with the present Royal Infirmary knows well the urgent necessity there is for the erection of a new modern hospital: not only is the provision of beds insufficient for the needs of the city, but the building is sadly out of date and the medical staff are constantly working at a serious disadvantage.

India.

THE DEFICIENCIES OF THE BURMAH MEDICAL DEPARTMENT.

A courageously outspoken report on the hospitals and dispensaries of Burmah, from the pen of Colonel W. G. King, I.M.S., Inspector-General of Civil Hospitals of the Province, has just been published. It reveals a lamentable state of affairs. In the first place, the establishment of hospital assistants is much below the sanctioned strength, and in spite of the recent formation of a medical school in Rangoon for their training, their pay is so inadequate that sufficient recruits are not obtainable; until something is done to improve their prospects the whole department must continue to be seriously crippled. Two years ago Colonel King submitted a memorial on their grievances, with recommendations for their amelioration, but no action has yet been taken by the Government. In the second place, the hospitals and dispensaries throughout the province are situated in utterly inadequate and unsuitable buildings, and devoid of the necessary surgical equipment, with the solitary exception of the new Rangoon General Hospital, and even this is still without clinical and pathological laboratories or an adequate casualty department and office accommodation. The hastily constructed buildings run up during the military operations when the enormous area of Upper Burmah was added to the empire still remain the only hospital accommodation in many important towns. Colonel King quotes the remarks of a high official who went to one of these hospitals for a minor operation, which had to be performed in the verandah in front of an admiring crowd, because it was the only place which afforded sufficient light. In 1907 a Provincial grant of Rs.50,000 was given, which was expected to be annually available until the present antiquated equipment of the hospitals was put on a satisfactory basis, but in the following year only one-fifth of this sum was available, and even this amount disappeared from the next budget. Colonel King points out that although imperial grants are made for sanitary purposes, they are never made for hospitals, and he very rightly suggests that the special backward circumstances of Burmah hospitals warrants a substantial imperial grant for their improvement. Another serious deficiency is the absence of a bacteriological institute in Burmah; it should be established in connexion with the Pasteur Institute already supported by the public, but would require Government aid for its adequate equipment. There is a precedent for assistance from imperial funds, as the Calcutta Physiological and Pathological Laboratory was largely built by a grant from the Government of India. If imperial funds are not available, the urgent need might, perhaps, be met by the levy of a special tax on each town to equip its hospital; a few pence a head would probably be sufficient for the purpose.

CHOLERA AMONG CALCUTTA EUROPEAN HOSPITAL NURSES.

On July 30th a terribly virulent outbreak of cholera occurred among the nursing staff of the European General Hospital at Calcutta; at the same time three children were attacked in one of the wards. During three days nine nurses developed the disease, of whom six died, in spite of the most assiduous attention on the part of the resident medical officers, sisters, and nurses. Extreme collapse set in with terrible rapidity, and although this was successfully combated by repeated intravenous saline transfusions, the reaction stage was so severe as to run on into the justly dreaded hyperpyrexial form, which no treatment served to control, the toxaemia being of an extreme degree. Mr. Haffkine and Major Clemesha have been closely investigating the origin of the outbreak, and although their report is not yet complete it is understood that cholera bacilli were found in the dregs of a milk jug, the contents of which had been taken by the nurses on the day before the outbreak, while a sweeper, who may have consumed some of the remains, also died of cholera at the same time. It is clear that the infections were all contracted at the same period, no fresh cases having occurred for some days past. There is strong reason to believe that the infection was carried to the food in the kitchen of the nurses' quarters by flies, either from a neighbouring servants' latrine, or more probably rom some native huts just over the wall of the hospital compound. Very numerous flies were found in the cook house, and had no doubt been bred in the manure which had recently been laid down on the racecourse close by.

A specially sad fact in connexion with this outbreak is that several cases of cholera which occurred in the wards of the hospital only last year were attributed to fly infection from the native huts just behind the main block. The Government accordingly sanctioned the clearing of these huts as soon as funds were available, but the stringency caused by the recent famine has prevented this improvement being yet carried into effect. Several of the nurses who succumbed had previously been in poor health; one of these was a lady who was engaged to be married to an officer of the Indian Medical Service (for whom much sympathy is felt at his tragic loss), but would not give up her work, and thus fell a martyr to duty.

Correspondence.

PRESCRIBER AND DISPENSER.

SIR,—The article in the BRITISH MEDICAL JOURNAL of the 21st on "Prescriber and Dispenser," deserves, and, I hope, will attract, the attention of the whole medical profession. The system of medical dispensing is peculiar, I believe, to England, of all civilized countries. It cannot be said to have increased the efficiency of treatment. Its effect has been rather the contrary. That it is disliked by dispensing chemists is not surprising, since it operates against them as a protected anachronism professing to do what they can do better. Yet the chief barrier to its extinction is not the counter prescribing practised more or less by all chemists, sometimes almost unavoidably. There is probably much less of this than is commonly believed, and I am certain that the great majority of chemists at the present day would be only too ready to come to terms with medical practitioners on this question if, and where, they were guaranteed the dispensing functions which are properly theirs.

On the other hand, there is no strong popular feeling against medical prescribing, unless, perhaps, among the poor, and not always among them, since an adjustment of terms is usually possible.

The one real obstacle that I have been able to recognize arises out of the fact that medical men expect by prescribing to lose touch in some degree with the treatment of their patients. The objection is not a trivial one, though its force is limited by qualifications. Not every patient is careful to stock his prescriptions, but a good many do, and these are prone to continue using them without resort to the original guide of their treatment, the practitioner, and even to carry them on from one illness to another. In some cases, and to a limited extent, never exceeding the duration of one illness, this proceeding may be defensible. Yet there are others, even though they be of quiet course, which require not only drugging but supervision. It is for the medical man to instruct his patient in this sense and as a rule he should be successful. It should also be clearly understood that prescriptions ordered in the course of one attack of disease are not to be employed in another, as otherwise a faculty of diagnosis is implied which the practitioner alone can safely exercise. With all these provisions, human nature and social conditions being what they are, there may still be some financial loss to the practitioner under this head. Such loss will consist largely of that portion of practice as now constituted in England which is non-professional, that is, of charges on drugs supplied.

Yet the practitioner who prescribes is not without compensations. He has saved on the actual cost of drugs which ought to be considerable in these days, he has much less anxiety and greater security in the administration of medicines, he is on more neighbourly terms with the chemist, his patients respect him more, he has time for the scientific pursuit of his profession and for rational relaxation. There is profit in all this, even commercial profit. Closely associated with this subject is the question of fees. There must always be greater difficulty in introducing such a change as this contemplated so long as ordinary fees are at a relatively low level.

This is the case in many parts of the country, notably in London, where the cost of living has increased considerably during the last twenty years, while fees, where they have not been seriously reduced, remain as they were. It is noteworthy, at the same time, that in some of the better-class districts the prescriptive method is displacing that of medical dispensing.

In your article you have rightly described the latter system as indefensible, and you have appealed to combination as the only remedy against it. There are not many medical men who will not endorse your statements. If combination towards this end can be brought into use by the British Medical Association, not as a weapon of compulsion, but as a means of amendment, there can be little doubt of its beneficial effect.—I am, etc.,

Highbury, N., Aug. 23rd. B. G. Morison.

Sir,—Adverting to your article on the eternal question of prescribing and dispensing, a method which works very well here is that the pharmacist shall do all the dispensing for a certain proportion of the sum which the doctor receives—say 25 per cent.

Thus, where a doctor attends a society for £10 per annum, the chemist supplies all the medicines for £2 10s. Of course this needs a deal of tact on both sides, but the pharmacist finds that when patients come into his place they buy various articles for the sick, whilst the doctor sees that the patients prefer going to the chemist because they believe he will not then limit them to the drugs which he might happen to have in his own surgery.—I am, etc.,

Dublin, Aug. 21st. J. C. McWalter, M.D.Brux.

RADIOGRAPHERS AND TREATMENT.

Sir,—The interesting problem raised in the two letters under the above heading in the British Medical Journal of August 21st, p. 498, has a wide application to many branches of professional work. It certainly deserves the most serious attention of all medical men if grievous disappointment is not to overtake us in our efforts to serve the public by strenuous devotion to the numerous special departments of our science.

The questions that many a man is asking himself to day are these: "How is it that, after having spent many years in perfecting myself in radiography, electro-therapeutics, bacteriological diagnosis, or vaccine therapy, and having fitted myself to give valuable assistance to my professional colleagues, I find these men either altogether indifferent to the class of help I can give them or endeavouring to secure it at the hands of laymen whose experience and skill are, without doubt, altogether inferior to mine? How is it that such practice as I have comes to me from the public, who frequently ask my assistance in matters for which my speciality is really of little avail, whilst I see highly suitable cases being treated by my colleagues on old-fashioned and less efficient lines, or being sent abroad or to lay institutions to secure the very treatment which I have studied so hard to make myself proficient in?"

The answer to these questions is, I believe, quite simple. The general practitioner cannot afford to introduce to his patients fellow-practitioners who are liable to become his competitors in practice. Rather than do this, they must forego such assistance as the specialist can afford or must endeavour to obtain it at the hands of those who cannot, from the absence of medical qualification, undertake the independent treatment of patients. The most scrupulous care to deal loyally with patients actually introduced will not avail to allay the general practitioner's quite reasonable fears of competition so long as the specialist undertakes any independent practice. Nor will the knowledge that the specialist will use no other method of treatment than that wherein he specializes suffice to establish confidence, for the tendency of all forms of treatment is constantly to become more widely applicable.

For the moment it is not necessary to inquire whether the fear of the general practitioner as to the danger to his practice of calling in specialists in consultation is well grounded or not. Such a fear has long existed with regard to the original specialists in medicine and surgery called consulting physicians and consulting surgeons, and is certain to increase as specialism increases. The questions I desire to submit for the consideration of your readers are:

1. Is not this fear the chief cause of the failure of the profession to make adequate use of the well-qualified specialists amongst its ranks?

2. Cannot this fear and its evil effects best be overcome by a sufficient number of specialists combining together to make known to their colleagues in general practice that they will not in any circumstances undertake the independent treatment of patients?

Finally, I would commend to the notice of your correspondents, "Radiologist" and "*X* Rays," a report "on the establishment of a special class of consultants," which was ordered by the Representative Meeting at Belfast to be submitted to the consideration of the Divisions of the British Medical Association, and which will shortly be circulated.—I am, etc.

August 21st. Professional Union.

THE DIAGNOSIS OF SYPHILIS BY SOME LABORATORY METHODS.

Sir,—The recent article of Dr. Bassett-Smith (p. 377) seems to place an element of doubt on the utility of the technique described by Dr. Fleming as a method of serum diagnosis of syphilis.

The simplicity and ease with which this reaction can be done in the hands of others than trained laboratory men makes it exceedingly valuable providing it will give results as accurate as some of the more complicated methods.

The principal objections to Dr. Fleming's technique, as Dr. Bassett-Smith contends, are that he fails to find haemolytic power for sheep's corpuscles in 30 per cent. of human serums, and that in 22 known syphilitics he failed to find the reaction by this method in over 50 per cent. Dr. Fleming in his paper stated that 10 per cent. of the serums of human beings possessed no haemolytic power for sheep's corpuscles, and in this he simply quotes the conclusions of Continental observers. My experience has been that in a series of over 500 observations with his technique the number of serums which do not possess any haemolytic power for sheep's corpuscles is less than 5 per cent., so that this cannot be a factor which will detract from the value of the technique, especially in view of the fact that to supply any deficiency it is only necessary to add a small amount of normal haemolytic serum in these cases.

Dr. Bassett-Smith finds that only 10 out of 22 known syphilitics give definite positive reactions with Fleming's method, whereas Dr. Fleming's figures show that over 90 per cent. of his cases show complete fixation. Many of the reactions on which he based his paper I have had the opportunity of confirming independently, my results in all cases agreeing with his, and, in addition, I have done a considerable number of observations since the publication of his method, and find that in practically all cases of syphilitic lesions, whether primary, secondary, or tertiary, a positive reaction can be obtained by this simple technique, provided a suitable heart extract is used.

As regards controls, out of several hundred only about 3 per cent. gave positive reactions, and on inquiry the histories of these patients left more than a suspicion in my mind that they might have been infected with syphilis.—I am, etc.,

F. J. Clemenger, M.D.,
Assistant in Inoculation Department,
August 19th. St. Mary's Hospital.

HOME CONDITIONS AND EYESIGHT.

Sir,—With reference to Professor Pearson's article in the Journal of July 17th, I am told that it is a very general experience of Christian workers, philanthropists, and school teachers that better-class parents in poor districts keep their children more indoors. As to the effect of this restraint on eyesight, I agree that it requires investigation.

With regard to the blind, let us hope that Professor Pearson will find time to consider whether their inclusion would modify the result.

The relative effects of certain home conditions and of inheritance upon another quality, namely, stature, may be estimated by reference to the report of Dr. Mackenzie and Captain Foster on the physical condition of children attending the public schools of the School Board for

Glasgow (Wyman, 1907). Thus, for boys of 10 they give the following figures (see Table 61 totals):

Number of Rooms per House.	Number of Boys Measured.	Mean Height of these Boys in Inches.
1	348	48.3
2	2,507	49.3
3	1,070	50.1
4	425	50 8

In order to compare these figures with statistics of inheritance, we require to find the correlation between rooms per house and stature. This may be done by the correlation ratio method introduced by Pearson. The correlation ratio between two characters A and B = (standard deviation of mean values of A corresponding to all existing B's) ÷ (standard deviation of A in general). Now taking A as height and B as rooms per house, the standard deviation of the above mean heights works out to 0.63 in. The standard deviation of height of the boys in general is unfortunately not given by Mackenzie and Foster, but we shall probably err on the side of making the effect of environment appear too small if we put it equal to the S. D. for adult stature, which is about 2.7 in. (*Biometrika*, vol. ii, p. 370). Then the correlation ratio between stature and rooms per house is $\frac{0.63}{2.7} = 0.23$. This is certainly smaller than the paternal correlation of 0.5, but also it is markedly greater than the correlations found by Barrington and Pearson between persons per room and either keenness of vision or refraction. The fact that all the four mean heights quoted from Mackenzie and Foster are below the Anthropometric Committee's standard average makes the above comparison with standard deviations and inheritance statistics drawn from a wealthier class of society rather uncertain.—I am, etc.,

Hampton Wick, Aug. 3rd. L. F. RICHARDSON.

LIGHT, PIGMENTATION, AND NEW GROWTH.

SIR,—In an article by Dr. Wilfred Watkins-Pitchford on Light, Pigmentation, and New Growth, appearing in the JOURNAL last week, he makes several statements remarkable, at any rate, for their ingenuity.

Apparently he thinks that cancer is due to too great stimulation of cells by light, and twists facts, and even anatomy, to suit his purpose.

To explain the great preponderance of cancer of the uterus, an organ especially protected from light, he claims that, lying as it does, behind the bladder, the urine in this organ exercises a dioptric effect on the actinic rays passing through the anterior abdominal wall. Why does he not go a step further and explain the frequency of carcinoma affecting the hepatic and splenic flexures of the colon by the dioptric effect of the urine contained in the renal pelves on the actinic rays entering the loin, as the sun does occasionally shine on the back? Again, the pylorus, according to *Gray's Anatomy*, lies behind the left lobe of the liver, and does not bear nearly as close a relation to the anterior abdominal wall as the fundus of the stomach, yet Dr. Watkins-Pitchford brings forward the frequency with which cancer affects the pylorus as evidence of his theory.

How does he explain that the situation of cancer of the oesophagus is almost invariably opposite the cricoid or the bronchus, or at the cardia of the stomach, and why do we hardly ever see cancer of the small intestine? The small intestine is freely exposed to these rays if they exist, and all parts of the oesophagus equally.

Again, a frequent site of cancer in animals, if not the commonest, is the breast; the part in which, according to Dr. Watkins-Pitchford, cancer "is usually due to deficient protection of the breasts from light." He does not adduce any evidence in support of his theory, but confines himself to statements, some of which are inaccurate. For instance, he says, "The preference shown by sarcoma for the femur and the neighbourhood of the knee-joint is probably due to the fact that of all regions of the limbs this one has experienced the greatest increase in illumination by the assumption of the erect attitude." Now how is this? Surely in the positions of squatting, crawling on all-fours, and climbing, the femur and knees are equally exposed as in walking. I should have said the clavicles and ribs and sternum were the most exposed by the change.

Finally, he recommends us all to go about in light-proof clothes. But why not adopt the time-honoured theory of irritation, causing proliferation of epithelial cells, which are obviously likely to be less stable than normally produced cells, probably the real cause of carcinoma?

At any rate, if not the real and only cause, it is the important factor, else why do we see it at all places where there is most irritation—the lip in the clay pipe smoker, the tongue opposite bad teeth, the tonsil, the three situations mentioned above in the oesophagus, the pylorus, the papilla of Vater, the appendix, the caecum (there is a sharp bend here), the hepatic, splenic, and sigmoid flexures (all bends), the rectum, and anus? Look at the association of cancer and gall stones, cancer and scars, cancer and tumours and mastitis of the breast, and we can dispense with actinic rays and dioptric effects.—I am, etc.,

Great Yarmouth, Aug. 23rd. R. LEONARD LEY, M.B.Cantab.

THE REPORTS OF THE POOR LAW COMMISSIONERS.

SIR,—The fact that there were no less than thirteen columns of the JOURNAL and SUPPLEMENT of last week devoted to the consideration of the Reports of the Poor Law Commission is evidence that you, Sir, are well aware of their importance. It is with great regret that I, and I know many others, see that you have already made up your mind that the proposals of the Minority Report are inimical to the interests of the profession.

The proposals of the Majority seem to me to recommend a system which is fatal to the best interests not only of the profession, but also of the poor and destitute who need medical relief, and therefore would, if adopted, injure the community at large. However, I do not think I need to point out the faults of the Majority Report, as I believe from your article you are well aware of these.

The Minority Report in the first place shows a complete knowledge and also, what is more important, an appreciation of the conditions of medical practice amongst the poorer classes. The authors know the conditions of the hospital out-patient departments, the dispensaries, and the work of the medical officers of the Poor Law, both in town and country. Their statements as to matters of fact are, I believe, absolutely correct, and I would earnestly ask those who are interested to read and reread the chapters dealing with the conditions.

The evidence which they have epitomized there shows the overlapping and abuse that is prevalent, the huge gaps in other directions, and the hard conditions under which the majority of practitioners do their work.

The scheme which they propose will, if adopted, ensure at any rate that the treatment of the poorer classes will be on a much larger scale, that it will be more efficient, and that the practitioner will in no case have to find the dressings or medicines. Since such a large mass of disease, and especially incipient disease, goes untreated at present, we may at any rate be certain of this—that a far greater number of people will be treated, and that this will take place under more favourable conditions. It follows that the remuneration of the profession engaged in this work will be largely increased. A greater number of men will be employed by the authorities, and it will lie largely with ourselves as to the salaries which will be given and accepted.

You appear to think that the official who is to be called the Public Registrar will be in a position to exercise autocratic powers, and you quote a paragraph which appears to bear out your fear. If, however, your readers will take the trouble to read the whole of the paragraphs bearing on his duties, I think there is no doubt whatever that such exercise of arbitrary power is not likely, or, if exercised, would speedily be cut short.

Again, with regard to "overlapping": the great fault of present day conditions *is* overlapping, and the scheme of separate committees to control separate departments, whose decisions are registered by the Public Registrar, is admirably calculated to ensure complete supervision and avoid both overlapping and omission.

With regard to the rural medical officers in the smaller districts, I doubt whether they care much about their appointments. Some seven or eight years ago, when I did for several successive summers a number of "locums," I was particularly struck with the unremunerative character of this work, and the admitted reason given for taking it: "I must not let any one else in this district." In any case there is no reason to postulate their extinction.

I do trust that the profession will hesitate before pronouncing against a scheme which, in the opinion of its authors and of many practitioners, will, if adopted, ensure that the medical attendance of the poorer classes will be put on a basis where the practitioner will be in a position of independence and authority which at the present time in his club, dispensary, and Poor Law practice he certainly is not.—I am, etc.,

London, August 23rd. H. Beckett-Overy.

⁂ We do not think that wise men can yet have made up their minds as to the effect of either the Minority or the Majority Report, and we trust that, *pro hac vice*, we may number ourselves in that class. Broadly, the view we have ventured to express is, that the recommendations of the Minority Report would, if carried out, bring about a revolution in the relation of the profession not merely to the municipalities and to the State, but to the community, individually as well as collectively, and that they therefore call for the very fullest consideration by the profession. There seems to be a certain risk that the picture drawn in the Minority Report, and still more highly coloured in the subsequent utterances of one of the Commissioners, may tend to prevent this full consideration being given to defects in the Minority Report, and to merits in that of the Majority.

THE POSTMASTER-GENERAL AND POST OFFICE APPOINTMENTS.

Sir,—Dr. Todd-White, in the Journal of the 21st inst., seems to have entirely misunderstood my letter on Post Office appointments. I had no intention of being understood as objecting to medical men taking an interest in politics. What I and, I trust, the major portion of our profession do object to is that these appointments should be political ones.

The choosing of Post Office surgeons ought to be in the hands of the permanent staff of the Post Office, and professional qualifications should be reckoned as a prior claim rather than political work done for the party in power.

Any one at all conversant with the making of these appointments knows well that such is not the case. The result of this course has been that appointments very unpopular with the Post Office staff have been made. Under present conditions, the candidate having the best chance is the one who can directly or indirectly most effectually influence the political party in power.—I am, etc.,

August 24th. Observer.

THE TREATMENT OF OPHTHALMIA NEONATORUM: NOTIFICATION AND THE POTTERY DISTRICT.

Sir,—In the towns of Fenton, Newcastle-under-Lyme, Longton, Stoke-on-Trent and Burslem, ophthalmia neonatorum is now a notifiable disease under the Infectious Disease Notification Act, 1889. In the Blue Book about to be published, regarding the midwives question, it is recommended that ophthalmia neonatorum should be a notifiable disease, and there is no doubt that it will shortly be notifiable throughout the kingdom.

The Royal Commission on the Blind, the Deaf and the Dumb, which reported to both Houses of Parliament in the year 1889, estimated that about 7,000 persons in the United Kingdom had lost their sight from ophthalmia neonatorum, and assesses the cost to the State of each of them at £50 a year, on a basis of £25 for keep and £25 for loss of useful work. That is, the cost to the State for these cases of preventable blindness is £350,000 a year. Now the medical profession is about to save the State this money, because the State is about to make it a notifiable disease, and has already done so in the towns mentioned above, thereby making it possible for the disease to be treated in its earliest stage.

The question which arises is, Ought the medical profession to save this yearly waste of £350,000 without any reward or remuneration? Clearly and emphatically, no. This is the principle we have most strenuously fought for in Liverpool, and Dr. Westby, the representative of the Liverpool Southern Division, at the Annual Meeting at Belfast, moved, in connexion with the treatment of ophthalmia neonatorum:

That the public authorities should not be relieved, at the expense of the charitable and of the medical profession, of duties which appropriately belong to such public authority.

This, I am very pleased to say, was agreed to. I would therefore ask the members in the towns in question to look immediately to their interests, and to act now. It is quite certain nobody will pay us for our services if we do not ask for it. The members would not only do themselves a good turn by obtaining what is right and due to the profession, but they would benefit the next generation of medical practitioners, and would be pioneers in this movement which would help members in other towns to obtain the same.

The important point I wish to emphasize on the members in the districts in question is, to act now, and with such just demands they will most assuredly be successful.—I am, etc.,

Liverpool, August 24th. A. Stanley Parkinson.

CANCER RESEARCH.

Sir,—I understand Dr. Keith and his principles perfectly. The incompatibility of the drugs is easily ascertained, and he might with advantage state the method of mixing them together, by which he is able to obtain a solution suitable for injection. He might also with equal advantage give an account of the results which he has obtained from the blood examination in his series of cases.

As a matter of fact, sodium cinnamate was the first of a series of chemicals with which I have been working, and in a paper read before the Second International Congress on Surgery, and published in the *Lancet*, September 24th, 1908, the basis upon which my work rests is explained. A reference to this paper will show how very closely Dr. Keith has followed my footsteps, and I certainly have desired to protest against the appropriation of my work without acknowledgement.—I am, etc.,

Hatfield, August 24th. Lovell Drage.

THE KINAESTHETIC AREA OF THE BRAIN.

Sir,—As an old and deeply indebted pupil of Dr. Bastian I am indeed sorry that I have apparently not realized the special limitation of the interpretation which he gives to the word "kinaesthetic." That term from its derivation has always seemed to me to be the more euphonious Greek equivalent of the clumsier "sensori-motor."

Possibly the misunderstanding has arisen from our commonly but wrongfully using the expressions "sensory" and "motor" when we ought to employ the terms "afferent" and "efferent." Since all nerve centres receive afferent and emit efferent impulses, I must confess that to me the spinal centres are as truly kinaesthetic as those in the central gyri, and to this generalization must be ascribed my failure adequately to appreciate Dr. Bastian's restriction of his term.—I am, etc.,

Ronsay, Orkney, Aug. 24th. Victor Horsley.

The Services.

THE INDIAN MEDICAL SERVICE.

A correspondent, who is in a position to know how the matter strikes newly-commissioned officers of the Indian Medical Service when they arrive in India, thinks that it ought to be understood in this country, both by possible candidates and by the teachers in the medical schools, that their feeling is usually one of keen disappointment. He reiterates the statement that private practice among natives has almost vanished for the Indian Medical Service. He considers that the position of an officer of the R.A.M.C. in India compares favourably with that of an officer of the Indian Medical Service, and in support of this sends us the following table, adding that reference to the Indian Army Regimental Monthly Pay Registers will show that the medical officer is the worst paid officer of

his rank in the regiment. He adds also that, though the system of the native station hospital for Indian troops has been introduced, the senior medical officer I.M.S., who is put in charge sometimes of as many as five hospitals, aggregating 250 beds, draws no extra charge allowance, although the medical officer R.A.M.C. does draw an allowance for a similar charge (vide A.R.I., vol. i, para. 155 [d. iii]).

(D) I.M.S. AND R.A.M.CORPS.

(i) *Unemployed Pay.*

	R.	a.	p.
Administrative ranks—			
P.M.O., H.M.F.'s, and Surgeon-General	1,200	0	0
Colonel	1,000	0	0
Other ranks—	I.M.S.		
Captain	475	0	0
Lieutenant	420	0	0

(ii) *Grade Pay.*

	I.M.S.			R.A.M.C.		
	R.	a.	p.	R.	a.	p.
Lieutenant-Colonels, specially selected	1,000	0	0	1,250	0	0
Lieutenant-Colonels	900	0	0	1,150	0	0
Major	650	0	0	789	3	0
After 3 years as a Major	750	0	0	—		
,, 15 years' total service	—			825	11	
Captain	400	0	0	475	0	0
After 5 years' total service	450	0	0	—		
,, 7 years' ,, ,, ...	500	0	0	530	0	0
,, 10 years' ,, ,, ...	550	0	0	650	0	0
Lieutenant	350	0	0	420	0	0

iii) *Charge Allowance to the S.M.O. in Charge of a Station Hospital.*

	I.M.S.	R.A.M.C.		
		R.	a.	p.
beds or over	Nil.	240	0	0
00 beds ,, ...	,,	180	0	0
00 beds ,, ...	,,	120	0	0
50 beds ,, ...	,,	60	0	0

TERRITORIAL FORCE.

CANDIDATES FOR SPECIAL RESERVE OF MEDICAL OFFICERS.

A CORRESPONDENT calls our attention to paragraph 232 of the regulations for officers of the Special Reserve, and suggests that it permits a man to be performing the duties of a medical man though unqualified. If he will read the paragraph again he will see that it applies only to those who are already in the Officers' Training Corps, which they join as students. Until they obtain their professional degree or diploma they will not be confirmed in a commission in the R.A.M.C., and consequently not regarded or treated as medical officers.

Paragraph 232 is as follows: "In the case of a candidate for the Special Reserve of Officers of the R.A.M.C. who is already in the Officers' Training Corps, but who has not yet obtained his professional degree or diploma, the period of probation will continue (for a period not exceeding two years, except under special circumstances) until such degree or diploma is obtained, when, other conditions being satisfied, he will be confirmed in his commission. During the extension of the probationary period the candidate will be shown as a lieutenant of the Special Reserve of Officers of the R.A.M.C. on probation, but will be required to undergo the annual or other training prescribed for a commissioned officer of his branch."

A PORTABLE FIELD KITCHEN.

A PORTABLE field kitchen of a very practical nature, the invention of Lieutenant and Quartermaster A. Sykes, of the 87th Royal Irish Fusiliers, is now under trial. It is in the form of a range, so closed that no light or flame is visible, and with it a hot meal for 1,000 men can be cooked on the march in any sort of weather and in a very short time. Oil is the fuel used; but to render it universally useful the inventor is considering a scheme to burn coal or wood also. No smoke or smell is emitted from the oil during the cooking; spray burners vaporize the oil before reaching the flame, so that the heat is greater and more widely distributed. The range weighs a little more than half a ton, so that with its complement of oil, food, and accessories it does not make more than a very light load for two horses in a general service wagon. It can be readily lifted out of the wagon and placed on the ground to cook in camp, or in a regimental cookhouse for ordinary use. It bakes, boils, grills, and fries separately or simultaneously, and to cook for a battalion for a day with oil at 6d. a gallon the cost is about 8s. Only one man is required to look after it, and a soldier of ordinary intelligence can learn its use in an hour. The range is balanced on an axle longitudinally, so that it swings freely, while each of the boilers is balanced on a transverse axle, so that, no matter what angle the cart may assume in passing over rough ground, the contents of the boilers keep a uniform level. To prevent any splashing a narrow concave flange is fitted inside the boilers, whose contents are protected from dust and dirt by a tightly fitting lid fixed by a lever movement. In this a small sliding panel is arranged to enable the cook to stir or add to the contents without taking the lid off. The kitchen has been at work during the recent divisional operations, and has been highly praised. A photograph of the kitchen, with a full description of it, appears in the *Military Mail* of August 20th, and to that article we are indebted for this abbreviated account.

Medico-Ethical.

The advice given in this column for the assistance of members is based on medico-ethical principles generally recognized by the profession, but must not be taken as representing direct findings of the Central Ethical Committee.

ATTENDANCE ON THE FAMILIES OF MEDICAL MEN.

ABERDEEN asks whether B. would be right in sending an account for attendance on the wife of C., a medical practitioner who, although he has a plate on his gate, is blind and is not generally recognized as being in active practice. He is married to a lady who is apparently of independent means. When C. asked B. to attend nothing was said about fees. B. is a young practitioner dependent on his earnings. The usual fees in the neighbourhood are three visits for a guinea.

*** As we have pointed out repeatedly there is no obligation to attend the families of medical practitioners without payment. It is at best a gracious custom. It is a pity that B. did not have an understanding at the beginning, as by this time the fees may amount to a considerable sum. We should advise him to see C. and have a friendly explanation, as if he were to send in an account without doing this he might be accused of behaving inconsiderately.

THE OBLIGATION OF A SUBSTITUTE.

EMERGENCY ATTENDANCE asks for an expression of opinion as to whether a practitioner who has attended the patient of another medical man in an emergency is thereby debarred from attending the patient or other members of the household at any future time.

*** This question has frequently been considered in the JOURNAL. What seems to be the general opinion is that the introduction obtained in that way should not be taken advantage of to the detriment of the original medical attendant, but that after an interval of time which has been suggested as two years, but which should not be interpreted too strictly, such an emergency attendance should constitute no bar to practice.

Medico-Legal.

OBSTRUCTION OF A MEDICAL OFFICER OF HEALTH.

AT the Thames Police Court, on August 20th, a milk-seller was summoned for obstructing the medical officer of health for Stepney in the performance of his duty, and was fined £5 and costs, or, in default, one month's imprisonment. The defendant was a man whose name had been taken off the list of milk-sellers last March, but information being received that he was still selling milk, the medical officer of health visited his premises. He was refused admission, and during the discussion heard the sound of a milk pail being moved. A constable was fetched, but the defendant still refused to allow the medical officer to enter the shop. The medical officer said that he did not produce a written authority showing who he was, but the defendant knew him. The defendant admitted in court that he knew the medical officer of health, but denied that he had received any milk on the day of his visit.

DEATH UNDER SPINAL ANAESTHESIA.

IN Clerkenwell, on August 20th, a coroner's jury returned a verdict of death from misadventure in the case of a child, aged 16 months, which died at Great Ormond Street Hospital just before the commencement of an operation for the removal of a malignant growth. The child was under spinal anaesthesia, the drug used being stovaine. Death was ascribed to respiratory failure, but the medical superintendent of the hospital said that he could not say that the drug used took no part in accelerating death.

DELAYED CHLOROFORM POISONING.

At an inquest on August 24th on a child aged 14 which died in the Royal Free Hospital, the cause of death was stated by the medical witness to be delayed chloroform poisoning. The child underwent an operation on August 16th, being anaesthetized by a mixture of which chloroform formed a part. Three days later she became delirious and afterwards comatose, and remained in this condition until her death on August 21st.

COMPENSATION CASE: FEE FOR CONSULTATION.

A. K. writes: I have been attending a woman who was injured in a bus accident and is claiming damages from the bus company. One morning I received a letter from the company's doctor asking me to meet him at the case that afternoon. I had no time to arrange previously about the payment of my fee, but did as he requested. Am I not right in claiming a special fee for this interview, and, as it was at the request of their doctor that I went, in holding the bus company responsible for its payment?

*** It appears to us that, in the circumstances, no fee is due to our correspondent from the company. The request of the medical officer was probably made out of consideration for the medical etiquette of the matter. A fee is due from the patient to the medical attendant, as his presence at the consultation may properly be taken to be in the interests of the patient.

Universities and Colleges.

SOCIETY OF APOTHECARIES OF LONDON.

The following candidates have been approved in the subjects indicated:

Surgery.—*H. S. Brown, *†J. A. Byrne, *†J. P. Henderson, *†B. A. Keats, *S. K. Poole, *†B. Robertshaw, *S. H. Scott, *†T. A. F. Tyrrell, *A. Whitby, *†F. H. P. Wills.

Medicine.—*H. S. Brown, †J. M. Burke, *†J. A. Byrne, *†J. P. Henderson, *†G. Holmes, †W. E. North-Smith, *†G. Tate.

Forensic Medicine.—J. A. Byrne, A. C. Dickson, C. S. Foster, J. P. Henderson, H. R. Ibbotson, B. W. Loewenberg, J. K. Nariman, G. Tate.

Midwifery.—J. P. Henderson, C. P. A. de L. Pereira, G. Tate, C. J. Thompson.

* Section I. Section II.

The diploma of the Society has been granted to Messrs. J. A. Byrne, J. P. Henderson, B. A. Keats, and F. H. P. Wills.

Obituary.

WILLIAM BROWN, F.R.C.S.E.,

CONSULTING MEDICAL OFFICER OF HEALTH FOR CARLISLE.

Mr. William Brown, who for twenty-five years and until his retirement last year was Medical Officer of Health for Carlisle, died at his residence at Craiglockhart, Edinburgh, last month. Mr. Brown, who was born at Wintershields, received his medical education at the University of Edinburgh; he obtained the diploma of M.R.C.S.Eng. in 1872, and seventeen years later was admitted a Fellow of the Royal College of Surgeons of Edinburgh. In 1873 he became L.R.C.P.Edin., and shortly afterwards was appointed House-Surgeon to the Cumberland Infirmary. A year later he took over the practice of his elder brother, the late Mr. Robert Brown, of Carlisle, who had been incapacitated by illness. He assisted the late Dr. Elliot in his work as medical officer of health, and succeeded him upon his death in 1883. Last year, the town council having decided to appoint a medical officer of health to devote the whole of his time to the duties of the office, Mr. Brown retired and was appointed Consulting Medical Officer for a period of four years. Soon after his appointment as medical officer of health he called special attention to the insanitary condition of certain private slaughterhouses, and to the existence of a virulent form of typhoid fever in their neighbourhood; as a result a public slaughterhouse was erected in 1887, and the private slaughterhouses abolished. He also brought about the abolition of ashpits and pigstyes in the town with resulting great improvement in the health of the city, especially in respect of typhoid fever. More than twenty years ago Mr. Brown studied the subject of the infection of milk by tuberculous cattle, and the importance of milk as a vehicle for typhoid fever. On his advice the Health Committee instituted systematic inspection of dairy cattle within the city, and the notification of tuberculous disease in man. He gave valuable evidence before the Royal Commission on Tuberculosis in 1897, and in many other ways took an active part in the advance of sanitary science. When the annual meeting of the British Medical Association was held in Carlisle in 1896 he was a Vice-President of the Section of Public Medicine. But he did not confine himself to this branch of medicine, and achieved considerable distinction not only as a general surgeon, but also in ophthalmology. He gave an interesting demonstration of cases before the Section of Ophthalmology in 1896. He was a Fellow of the Royal Microscopical Society, and at one time President of the Carlisle Microscopical Society.

He was a man of unassuming disposition, and all who knew him, either as medical officer of health or in his capacity as a private practitioner, formed a high opinion of his abilities and disinterestedness.

The death is announced of Mr. Robert G. Coombe, formerly of Burnham, Essex, in his 92nd year. Mr. Coombe was admitted a Member of the Royal College of Surgeons in 1841, and was elected a Fellow in recognition of his high professional attainments in 1884.

Dr. Otto v. Bollinger, Professor of Pathological Anatomy in the University of Munich, died on August 13th, after a short illness. Professor Bollinger, who was in his 67th year, made many contributions to the knowledge of the etiology of actinomycosis, tuberculosis and cardiac hypertrophy, and to the causes and phenomena of meat poisoning. He joined the staff of the *Muenchener medicinische Wochenschrift* in 1879, and the eminent position which that periodical has now attained was largely due to his energy and ability. He took a great interest in questions affecting the social welfare of the profession, and was particularly active in promoting the local society for providing pensions for the widows and orphans of medical men.

Public Health

AND

POOR LAW MEDICAL SERVICES.

CERTIFICATE OF SUFFICIENT WATER SUPPLY.

J. P.—When the owner of a newly-built house in a rural district applies, in accordance with Section 6 of the Public Health (Water) Act, 1878, for a certificate that there is a sufficient water supply, the application is made to, and the certificate is obtained from, the sanitary authority, and not from the medical officer of health. The owner of the house cannot be called upon to pay a fee either to the sanitary authority or to the medical officer of health.

DISPENSARY FOR POOR LAW PATIENTS.

Delta writes: Is a district medical officer living within his own district in a large provincial town in England at liberty to open a surgery or dispensary within that district for the purpose solely of his Poor Law patients?

*** The objection to such a course would be that the guardians might fear it was part of a plan to differentiate between pauper and other patients—a differentiation which might extend further. If this objection be waived, there must be many Poor Law districts where a central surgery at which the pauper patients might attend would be a great convenience to them.

At an inquest on a baby on August 24th, Dr. Waldo, the Coroner for Southwark, drew attention to the dangers involved by the Government stamp on secret remedies. These stamps, in his experience, did a great deal of harm, because poor and ignorant mothers and other persons thought that the medicine must be good because it bore a Government stamp. It was true that the words "no Government guarantee" appeared on the labels, but it was often in small type, and many of the persons who used these remedies overlooked these words, or could not read them. The Government received £240,000 in one year from these stamps, and now, with a Free Trade Government in office, there ought to be a good opportunity for getting rid of them.

Letters, Notes, and Answers.

BRITISH MEDICAL ASSOCIATION AND BRITISH MEDICAL JOURNAL.

THE offices of the British Medical Association and of the BRITISH MEDICAL JOURNAL are at 429, Strand, London.

☞ *Queries, answers, and communications relating to subjects to which special departments of the* BRITISH MEDICAL JOURNAL *are devoted will be found under their respective headings.*

QUERIES.

DEAFNESS wishes to know of a school which would admit a girl, aged 6 years, who is quite deaf, following otorrhoea three years ago. Most institutions known do not take cases under 7 years of age.

C. E. W. asks for advice in the treatment of a lad, aged 14, whose ankle twists over very readily on rough or slippery ground. He has strapped and bandaged it, given him a laced anklet and a "Holland's" sock (valgus). All these are of great service to him, but fail to prevent side-slip entirely. He is a weedy-looking boy.

TUBERCULOUS SINUS.

SINUS asks for advice in the treatment of a patient who, as the result of a tuberculous abscess two and a half years ago, has a sinus running from the outer side of the middle of the thigh behind the femur. Examination by the *x* rays shows no disease of the bone. The condition has been treated by incision, by complete excision twice, by injection of tuberculin (Koch's old and also T. R.), by scraping and packing, by syringing with various antiseptics, including peroxide of hydrogen, iodide dissolved in ether, iodoform emulsion, and enzymol, and also by dry cupping, but all to no purpose, although the patient is otherwise in good health.

PRIMULA RASH.

PRIMULA asks for the experience of other members in respect of primula poisoning. His patient, a gardener, aged 53, suffered ten years ago from an intense irritation of his hands and arms, due to working with primulae, and two months ago began to suffer again. When seen then the condition was acute, and sedative lotions were prescribed. The patient failed to present himself again for several weeks, and the condition then found was as follows: The skin of both forearms and backs of the hands was thickened, slightly scaly, and intensely irritable, having a dry eczematous appearance, interspersed with hard subcutaneous lumps, the size of a pea. The irritation was greatly aggravated when working near the stoves. There was also a similar condition on the forehead, ascribed by the patient to rubbing his face with his hand during work.

ANSWERS.

INCOME TAX.

F.R.C.S.E.—If the surveyor of taxes requires an allocation of expenses between income from appointments and that from general practice, the best method will be to divide such of the professional expenses as are common to both branches roughly in the proportion that the receipts from the two branches bear to one another. When the expenses relating to the "public offices" have so been ascertained the remainder of the total expenses should be set against the fees received in the course of general practice. The life assurance premiums should not be deducted as expenses, but shown separately in the space provided in the income tax return.

TWITCHING OF LEGS.

DR. C. E. W NCKWORTH writes: In reply to "Manaos" I would advise him to give his patient 60, or even 80, grains of potassium bromide about half an hour before bedtime, or if that fail, 20 to 30 grains of chloral hydrate. It is often difficult to diagnose the cause of the "twitchings" and whether they arise from some special irritability of the spinal cord, set up by too much sexual indulgence or whether they are caused by disease of the spinal cord.

ANTIDIPHTHERIA SERUM IN ASTHMA.

LIEUTENANT-COLONEL JOSHUA DUKE, I.M.S.(ret.), writes: With reference to the treatment of asthma by antidiphtheria serum, in 1901-2 in the Punjab, during a number of inoculations for plague with Haffkine's preventive serum, it came out that several *cures* of patients suffering from asthma had occurred. Whether the relief was permanent, or how long it lasted, cannot be stated. One other instance of relief afforded by the same serum happened in the case of a married woman (a multipara) who had suffered all her life from acutely painful dysmenorrhoea. The reaction of the serum in her case was very severe. But this woman assured me that she had passed two subsequent periods without any suffering whatever. Whether the relief to this person was continued cannot be stated, as such cases are lost sight of. Speaking from memory after a lapse of years, the curious and inexplicable action of Haffkine's serum in cases of asthma made a strong impression on my mind.

DUTCH DROPS.

F.R.C.S.—Two formulae are given for Dutch drops in the *Pharmaceutical Journal Formulary:*—

1. Resin, 1 pound; sulphur, ½ pound; linseed oil, 20 fl. oz.; oil of turpentine, 10 fl. oz.; strong solution of ammonia, 20 minims. Mix.
2. Balsam of sulphur, 1 fl. oz.; oil of turpentine, 1 fl. oz. Mix.

SPARKING PLUGS.

WE have on more than one occasion published warnings with regard to the sale of sparking plugs by agents who call upon doctors, but it appears that the scheme is still pursued. Dr. Lavery, of Dundalk, writes to advise any medical man who may be called upon by a person giving the name of A. C. Goodwin, and his address as 47, Oxford Street, W., to make full inquiries before parting with money or entering into any agreement to purchase plugs. There may be only one agent who possesses several names, and it is possible that any one who cares to communicate without delay with the police will find them not only ready but anxious to take a share in the inquiries.

SHIP DISINFECTION: PARATYPHOID INFECTION.

EASTERN.—(1) We do not know the Marot process. It is perhaps a modification either of the Clayton process (sulphur fumes) or of the French method (CO gas). In both of these the gas is generated either on board the ship or in barges alongside, the fumes being conveyed to the holds by pipes. Accidents have happened with the CO method, and, on the whole, the sulphur method is preferable. (2) The differentiation of the paratyphoid bacillus from the typhoid bacillus is a very large subject, and for further information our correspondent should consult any recent work on bacteriology. There are two principal varieties of paratyphoid bacilli, (*a*) the paratyphoid A., (*b*) the paratyphoid B. (Conradi-Drigalsky). Gaertner's bacillus is also now included in this group, and the *Bacillus psittacosis* might be added. Paratyphoid bacilli are distinguished from colon bacilli by the following characters: They do not ferment lactose, or at least only to a very slight extent, and no indol is produced; they are more motile, and possess about twelve cilia each. From typhoid bacilli they differ in fermenting certain hydrocarbons, such as glucose, maltose, dextrose, etc. It is often quite impossible to distinguish paratyphoid infection from typhoid, except by the serum reaction. Leclercq states that a more sudden onset, an irregular temperature chart, and a more rapid progress are in favour of paratyphoid. According to the particular organism which is agglutinated by the patient's serum, so should it be concluded that the infection is due to this particular organism, though some serums may agglutinate several forms of the bacillus, and thus give rise to difficulty. The etiology of paratyphoid resembles that of typhoid, water being the chief source of infection. Infected meat and oysters have also been blamed.

LETTERS, NOTES, ETC.

ERRATUM.

IN the BRITISH MEDICAL JOURNAL of August 14th, page 374, line 20, for "Lieutenant-Colonel Bull, R.A.M.C.," read "Lieutenant-Colonel Butt, R.A.M.C."

A CASE OF GALACTORRHOEA.

DR. WM. B. ARTHUR (Wingate) writes: J. H., aged 19, primipara, well formed, pale, subject to periodic attacks of asthma (cause unknown), was delivered on February 8th, 1909, of a full-term male child. The child's throat and pharynx were malformed, it could not swallow, and died on the thirteenth day. The mother's breasts were treated in the usual manner with belladonna plaster and magnesium sulphate and tincture of belladonna were given internally, and continued until the end of the fourth week, at which time the milk secreted during the night was sufficient to soak three large bedroom towels. Painting the breast with liquor atropinae sulphatis, cold applications, the internal administration of ergot, ammonium chloride, and opium, and the limitation of liquid drunk to half a pint a day, entirely failed to diminish the secretion to any appreciable extent. At the end of the seventh week compression by means of a broad band of holland adhesive plaster passing over both breasts and round to the back of the chest, the two ends crossing, was tried; the band could thus be tightened each day from behind. At the end of the fifth day the secretion had entirely ceased, without pain or other complication.

SCALE OF CHARGES FOR ADVERTISEMENTS IN TH BRITISH MEDICAL JOURNAL.

	£	s.	d.
Eight lines and under	0	4	0
Each additional line	0	0	6
A whole column	2	13	4
A page	8	0	0

An average line contains six words.

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Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Wednesday morning preceding publication: and, if not paid for at the time, should be accompanied by a reference.

N.B.—It is against the rules of the Post Office to receive letters *Postes Restantes* addressed either in initials or numbers.